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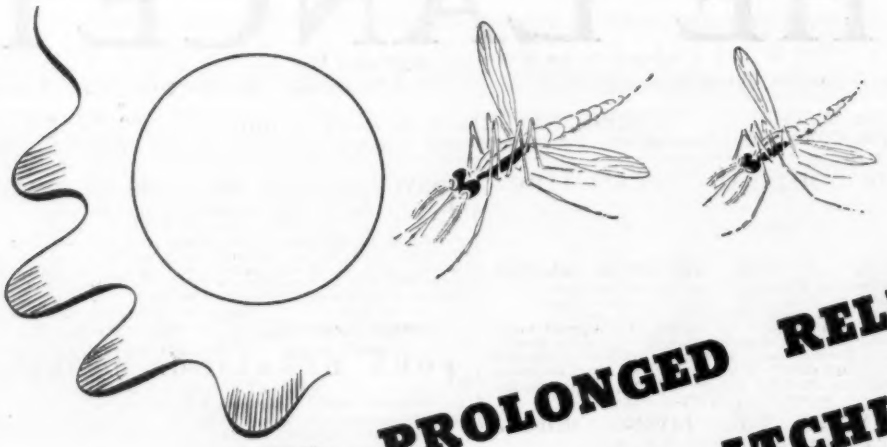

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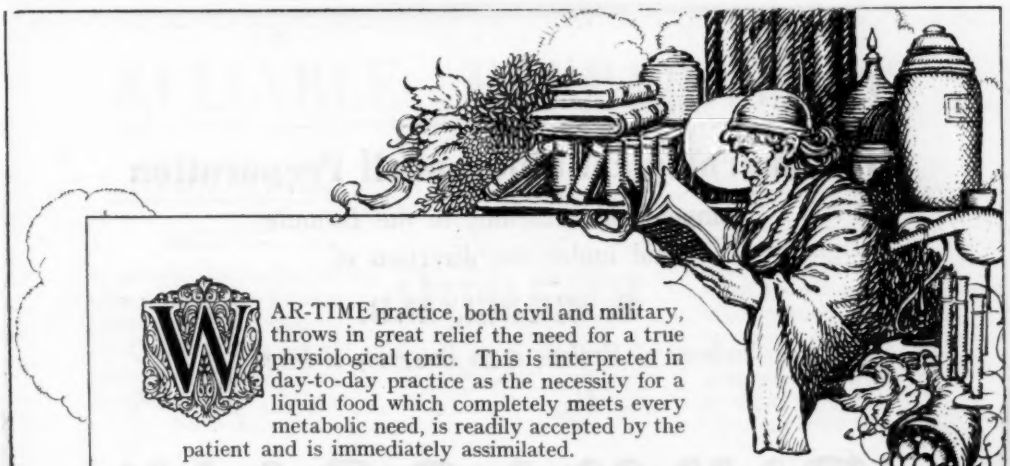

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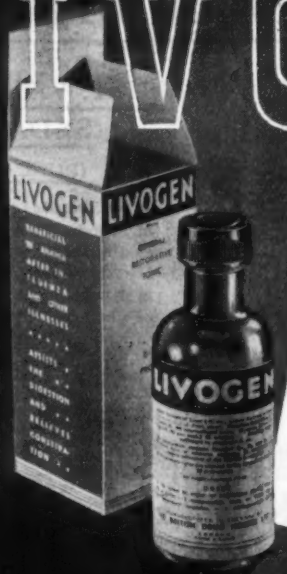

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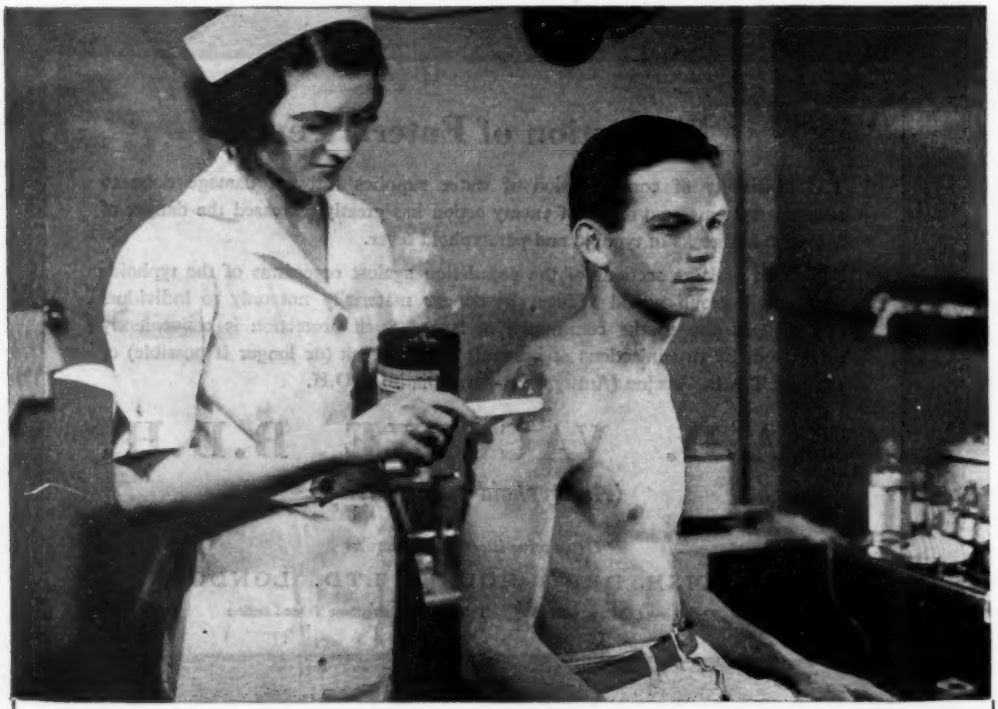

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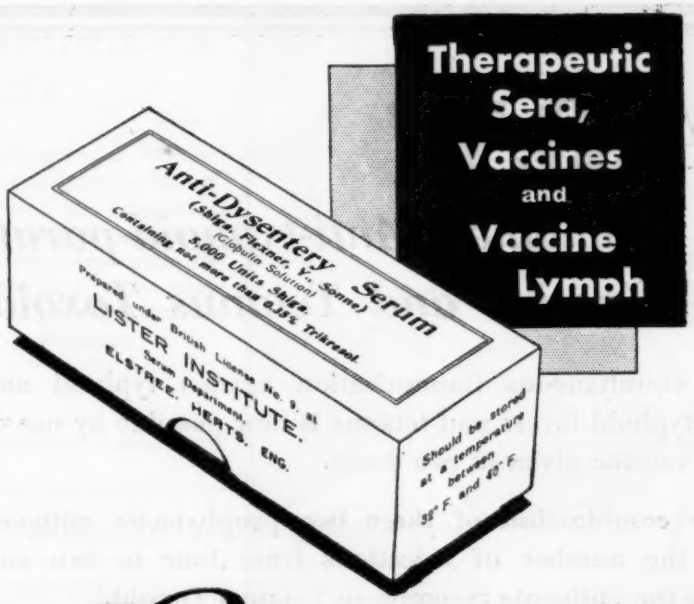

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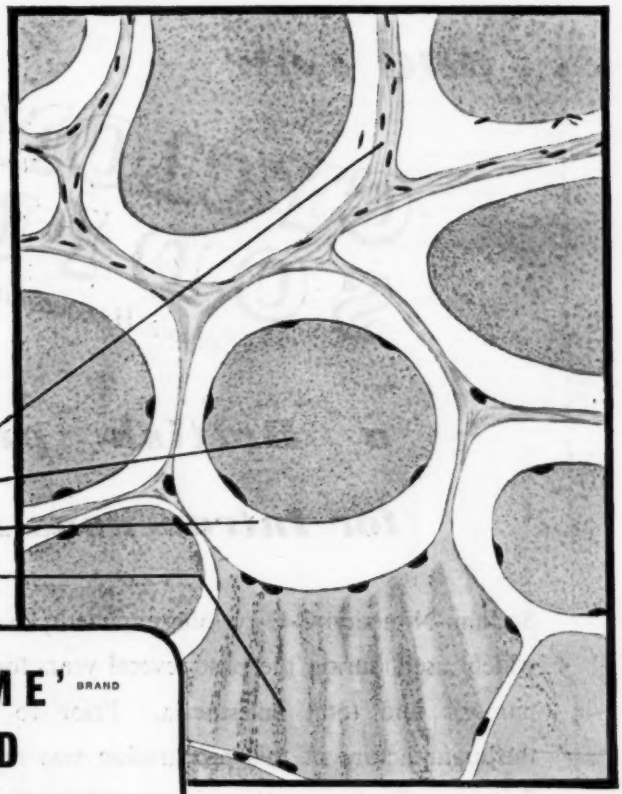

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ORIGINAL ARTICLES

TREATMENT OF GUNSHOT WOUNDS OF PERIPHERAL NERVES

BY HUGH CAIRNS, D.M. Oxfd, B.S. Adelaide, F.R.C.S.
COLONEL A.M.S.; NUFFIELD PROFESSOR OF SURGERY IN THE UNIVERSITY OF OXFORD; AND

J. Z. YOUNG, M.A. Oxfd
FELLOW OF MAGDALEN COLLEGE, OXFORD

IT is useful at this stage of the war to review, on a basis of the reports resulting from the war of 1914–18 and on experimental work, some aspects of gunshot wounds of peripheral nerves.

DELAY BEFORE OPERATION

The nerve injuries of war differ from those of peace in that immediate suture of a divided nerve is almost never possible, owing largely to infection. Bad results after nerve suture in septic wounds are held to be due to intense formation of connective tissue within and without the nerve, which provides a barrier to regenerating nerve-fibres (Stopford 1920b). Immediate suture is always desirable wherever possible and the position as regards war injuries might be altered by modern chemotherapy of wounds. Further, in war wounds so much of the damage is due to bruising or to some other reversible form of commotion, as opposed to severance of nerve-fibres, that until some time after the injury it is impossible to assess the extent of the permanent damage. There is a remarkably high proportion of spontaneous recoveries in nerve injuries of war; thus, Foerster (1929) found, among 3099 personal cases whose progress was followed, 1320 which made a complete motor recovery and 660 which recovered partially without operation. Such figures give strong support to those who advocate a waiting period before any attempts are made to assist recovery by operation.

When the wound has healed, decision on the question of exploration is influenced by several factors, of which the most important is the clinical progress. Recognition of the early signs of regeneration depends on the most thorough sensory and electrical examination at regular intervals by a trained observer with a knowledge of trick movements and of the possible variations in the normal motor and sensory supplies (Stopford 1930, Rosenstein 1935) and in the electrical reactions during recovery of functions.

After the last war opinions differed about the time of waiting for spontaneous recovery. The Medical Research Council committee on injuries of the nervous system (1920) advocated operation after an interval of only two months if the lesion remained complete in spite of adequate conservative treatment. Stookey (1922) also favoured early exploration. From analysis of his vast material Foerster (1929) considered that the period of delay should be four to six months.* Most of the cases which make a satisfactory spontaneous recovery will show some signs of this within the first six months. On the other hand, the results of nerve suture suggest that the time of waiting should not be prolonged much beyond this period; in cases operated on after the end of seven months the chance of nerve suture being successful was much less than in sutures performed at a shorter period (see table). Why this should be so is not fully explained.

It is not known whether the power of regeneration persists indefinitely in the central stump, or whether the peripheral stump is at all times equally able to receive new fibres. That peripheral conditions are important is suggested by observations made in the last war that in cases of complete resection and suture of nerves already partially recovered—e.g., cases of ulnar-nerve injury in the upper arm in which the long ulnar flexor muscles had already recovered while the small muscles of the hand still remained completely paralysed—the subsequent recovery of the muscles already spontaneously recovered was remarkably rapid. The statement of the Medical Research Council committee (1920) that "the interval between the wound and the operation has no influence on the time taken for recovery" implies no recognition of the importance of the changes which take place in the peripheral stump, end-organs, and muscles. In practice, as Platt (1921) and Lewis (1920) have insisted, there is a good chance of successful recovery only when nerve suture is performed within eighteen months after the injury, though recovery after much longer periods has been reported; for instance, Stopford (1920) mentions two cases in which suture of the median nerve two and a half years after injury was successful.

RESULTS OF NERVE SUTURE AND NEUROLYSIS (FOERSTER 1929)

Interval between injury and operation (months)	Nerve suture				Neurolysis			
	Cured	Improved	Not improved	Cured (%)	Cured	Improved	Not improved	Cured (%)
1	2	1	..	67	5	1	..	83
2	16	8	..	67	24	2	1	91
3	26	10	1	70	22	5	3	73
4	33	15	1	67	19	6	..	76
5	40	21	2	63	28	6	..	82
6	22	15	2	56	18	5	..	78
7	16	10	1	59	4	3	..	57
8	7	10	1	39	5	1	..	83
9	7	17	1	28	2	1	..	67
10	12	12	1	48	6	2	..	75
11	3	9	..		3	..	..	
12	9	11	..		4	3	..	
13	4	5	..		2	4	..	
14	1	1	..		1	..	..	
15	..	3	..		5	..	..	
16	1	2	..	32	1	..	..	71
17	1	3	..		..	..	..	
18	1	..	1		1	..	..	
19	..	1	..		..	..	..	
25	..	1	..		..	..	..	
29	..	2	..		..	..	..	
30	..	..	1		..	..	..	

Sutures = 370		Neurolyses = 188	
Cured .. 201	= (55%)	Cured .. 145	= (77·2%)
Improved .. 157	= (42%)	Improved .. 39	= (20·7%)
Not improved 12	= (3%)	Not improved 4	= (2·1%)

In the absence of sepsis early operation may shorten the period of incapacity in cases of anatomical division even though, according to Foerster (1929), the recovery would not be more complete. It seems clear, however, that to operate before five to six months have elapsed would often entail an unnecessary operation. In the last war Spielmeyer (1918) found from histological examination of resected material that nerves were being subjected to resection which would probably have recovered spontaneously if left alone. Probably there is always a tendency, in switching from the nerve surgery of civil life to that of war, to be too radical at first.

CONSERVATIVE TREATMENT

The importance of intensive physical therapy in all cases cannot be overemphasised, because its extreme importance has not always been appreciated in the past. The success of nerve suture depends on daily physical therapy continued without interruption for a year or more after operation. In the last war lapse of treatment led to arrest of recovery. Paralysed muscles should be relaxed and prevented from overstretching, joints must be moved to prevent stiffness, muscles must be passively moved to prevent contracture, and the limb should be kept warm with clothing, frequent warm baths, and massage. Paralysed muscles require electrical treatment under the direction of an expert. How much effect this treatment has on the wasted muscles is not certain in view of the experiments of Langley and his co-workers (1914–15, 1918–19); but there is no doubt about the beneficial effect on the nutrition of the limb and on its readiness to become useful once voluntary power has returned. And from the psychological point of view its value is profound. The patient needs constant encouragement during the long

* This rule was subject to exceptions which cannot be enumerated in this short review.

months of waiting for recovery and again later during the period of re-education of the limb, when voluntary exercises transcend in value all other forms of physical therapy.

This review is not intended to cover what might be called the exclusively orthopædic aspects of nerve injuries, which in war are all too often associated with gross damage to adjacent bones, joints, and muscles. This damage has an important influence on recovery of the nerve, as Stopford (1920a) and many others have shown. Close coöperation between neurologist, orthopædic surgeon, physiotherapist, and neurosurgeon is so essential that there is indeed a strong case for segregating these patients in a centre staffed with the appropriate personnel. In the United States in the last war twelve hospitals were established as "peripheral nerve centres" (Frazier 1920).

NEUROLYSIS OR NERVE SUTURE

Where there is no sign of functional recovery after the defined period of observation, the nerve is exposed at operation and dissected free from scar tissue. In 248 of 566 such operations (44%) Foerster (1929) found complete or virtually complete loss of anatomical continuity. Where the continuity of the nerve is preserved, the decision between resection and some form of neurolysis may be a matter of considerable difficulty. Marie and Foix (1916) advised that the surgeon should be guided by the macroscopic appearance and consistence of the damaged nerve. Foerster at first agreed with this view but later concluded from further experience that the naked-eye appearances were often no guide to the possibilities of regeneration; in doubtful cases he preferred to base his judgment on electrical stimulation of the proximal part of the exposed nerve at the level of healthy looking fibres. Faradic stimulus is satisfactory, but a more easily controlled stimulus is provided by the thyratron discharge with impulses at rates of 20–50 a second. This method of testing can only elicit a response from those fibres which have completed their regeneration to motor end-organs, and Platt (1921) considers that absence of motor response on proximal stimulation does not necessarily justify resection. It may be possible to use the oscillograph to demonstrate the presence of growing fibres in the nerve distal to the site of injury.

The difficulty of deciding whether to resect or not is greater in cases explored before the end of six months, because the liability to spontaneous recovery will not have been thoroughly eliminated. In some cases it will be easy to decide what to do—e.g., when the nerve scar is intensely hard. But the doubts which exercised surgeons in the last war suggest that histological information about nerve regeneration in man is still far from complete. To what extent will nerve-fibres successfully grow through scar tissue and through end bulbs? What macroscopic changes appear in the distal stump when nerve-fibres grow into it? To what extent is it necessary to resect the proximal end to obtain healthy fibres in adequate numbers, especially in those cases in which intraneural fibrosis is of considerable longitudinal extent? Surgery in the past has obtained very little from histopathology in the answer of these questions. It is true that histological material has not often been abundant, but the main difficulty has been that the staining methods were not adequate to show both nerve-fibres and supporting cells in material fixed by a uniform method and were to some extent difficult of application. The method of Bodian (1936) should do much to overcome this deficiency.

NEUROLYSIS

If resection is not performed, the nerve-sheath is freed from scar tissue and replaced in a healthy bed with or without a wrapping (see below). This is the operation of external neurolysis. As Platt (1921) points out, it differs little, if at all, from the preliminary steps of all operations on nerves. In the hands of Foerster (1929) the results after this operation have been good at all stages after the injury (see table). In criticism of these figures it must be said that a considerable number of the patients were operated on soon after the injury, before they had been proved incapable of spontaneous recovery; and in the late cases it is not impossible that there were included progressive lesions—e.g., musculospiral paralysis of late development after a wound involving the humerus. However, the results as a whole suggest, contrary to the fears of Leriche (1940), that there is little risk of ischæmia as a result of stripping the nerve from its bed, if it is handled gently.

RESECTION AND SUTURE

Resection and end-to-end suture of nerves are by no means a simple procedure, and it is important that the surgeon without previous experience of these cases should recognise at the outset that such operations and the attendant dressing take much time. Gunshot wounds of nerves are apt to damage several centimetres of the nerve. While some have claimed that it is not necessary to resect end bulbs (Joyce 1918–19), it seems reasonable to assume that nerve-fibres will grow into the peripheral stump better from parallel columns placed end to end than from an end bulb in which bundles of nerve-fibres run in all directions. Indeed, histological evidence suggests that the formation of an end bulb or "neuroma" will effectively prevent the passage of fibres between the central and the peripheral stumps in sufficient numbers to produce functional recovery.

In end-to-end suture it is important to avoid tension. Nerves do not stretch easily, and attempts to stretch them may produce severe damage in the proximal nerve trunk. According to Stookey (1922), a nerve should only be stretched to the point of normal laxity. He reports two cases (one median, one sciatic) in each of which at a first operation the widely separated proximal and distal end bulbs were joined after the gap had been reduced by limb posture. During the next few weeks the nerve was stretched by gradually straightening the limb into its normal position. At a second operation the nerve was found united, and the scar was excised. Cross-sections of the proximal part showed loss of normal pattern and great increase of perineural and endoneural scar tissue far above the level of the lesion. The stretching, Stookey considers, produced intraneural hæmorrhages and scar formation far up into the proximal part of the nerve. Stopford (1920b) and Frazier (1920) took a less unfavourable view of nerve stretching. In certain nerve trunks gaps can be bridged by transposition of the nerve into a shorter course.

FUNICULAR APPOSITION

There is no clear agreement about the importance of maintaining correct funicular apposition after suture. Since there is no evidence that either sensory or motor end-organs specifically attract their appropriate fibres, it seems probable that correct functional connexion is only obtained by the chance outgrowth of new fibres into channels which lead to end-organs similar to those with which they were originally connected. If this is so, it is not surprising that functional recovery is seldom complete. It is more surprising that any satisfactory recovery takes place at all, and it is not to be wondered that nerves with a mainly motor function, such as the musculospiral, recover better than those with mixed functions. In the central stump each axon branches many times, and there are far more fibres in the regenerated peripheral stump than in the central end (Dogliotti 1933). Probably this branching is an important factor in functional recovery; it ensures that some fibres at least reach appropriate destinations. Thus, if all the fibres of a nerve innervate muscles of one group—e.g., extensors of the wrist—this mechanism makes certain a considerable return of function, even though a fibre very rarely returns even approximately to the muscle-fibres with which it was originally connected. This is doubtless the explanation of the fact that recovery of isolated muscle action almost never takes place. According to Platt (1921), after musculospiral paralysis, even when full conductivity has been restored, individual extension of the fingers is not perfect. After recovery from injury to the facial nerve the patient invariably remains incapable of contracting the previously paralysed cheek muscles without at the same time closing the corresponding eye.

Unmixed sensory nerves appear to recover remarkably well. It is well known how often sensibility returns after destruction of the branches of the trigeminal nerve with alcohol. Another example is the invariable recovery of sensibility of the scalp after cerebellar operations by the

crossbow incision, although no attempt is made to approximate the ends of the severed great occipital nerves. Possibly the small size of these nerves favours their recovery.

In mixed nerves the chance of recovery is smaller, because fewer fibres will return to appropriate muscles. The possibilities of "re-education" of motor neurons and their central connexions are probably not very great. No doubt correct funicular apposition helps in directing the new fibres towards appropriate channels, but even in the best cases the successful result is probably achieved by the profusion of branching, which ensures good luck. In any case there are many regions of the nerves where internal anastomosis is so complex and the pattern of the nerve changes so rapidly that, if any considerable length has been excised, correct funicular apposition is impossible (Langley and Hashimoto 1917). Therefore, while rotation of stumps should be avoided as far as possible, there is no reason to make a fetish of this point.

WRAPPINGS

To prevent the strangulation of the nerve with scar tissue, several surgeons have suggested wrapping of the nerve after suture, especially if no satisfactory bed of uninjured fascia or muscle can be found for it. Published reports contain sufficient evidence to allow some appraisal of these procedures. Fascia lata should not be used, because it may contract on the nerve. Cargile membrane, first suggested by Sherren (1906), was successfully used by Joyce (1918–19) and Stookey (1922) and was found experimentally by Huber (1920) to give very good results. If used fresh it is absorbed within ten days, but if alcoholised before use it remains indefinitely and sets up very little reaction. Thin sheets of guttapercha or of amniotic membrane may be equally effective.

Grafts of fat, either free or pedicled, have been advocated (Tinker and Tinker 1937), but the clinical figures given are not decisive, and Huber (1920) has found that such grafts are converted into fibrous masses. They should not be used without further investigation.

END-RESULTS

After the last war few end-results were published. Of what Platt (1921) calls "intermediate results," which were reported in considerable number about 1919–21, critical accounts are rare. No standard criteria of recovery had been established, and too often the evidence for regeneration was not conclusive. Improved sensibility is often due to enhanced function of overlapping cutaneous nerves, unless it occurs in the centre of the anæsthetic zone. The presence of paræsthesia on percussion of the nerve distal to the level of injury or suture (Tinel's sign) is likewise no certain sign of recovery; it may be present in lesions that remain permanently complete, and may be absent throughout the whole period of a successful recovery. Electrical reactions also are not dependable. The usefulness of the limb is not always an indication of recovery—e.g., in median-nerve lesions the hand may become useful although the paralysed muscles do not recover.

The best method is probably that of Stopford (1920a) of recording recovery in terms of each paralysed muscle and of sensibility. Foerster tabulated his results in terms of motor recovery (see table). His "cures" were cases which showed strong contraction of all the previously paralysed muscles, an exception being made for the small muscles of the foot in lesions of the sciatic nerve and its branches. The "improved" cases were those in which recovery was observed in one or more but not in all of the previously paralysed muscles. The "failures" were those cases observed for not less than five months after operation—the average interval between nerve suture and the first signs of recovery—in which no recovery of power was observed. This method of assessing results takes no notice of recovery of afferent pathways concerned with movement. According to Stopford (1920a) there are cases, especially those affecting the hand, in which all the muscles have recovered voluntary power and yet the hand is of little value for purposive movement because there is no recovery of postural sensibility. The value of Foerster's "improved" group is also doubtful; for example, in lesions of the ulnar nerve above the elbow recovery of the flexor carpi ulnaris produces little improvement if the small muscles of the hand remain paralysed.

Foerster's results are remarkably good. It is possible that they were to some extent a favourable group, for it is unlikely that a neuro-surgeon would receive cases complicated by severe bone injury, such as ununited fracture. However, the excellence of the results probably depends to a large extent on the fact that the cases were followed throughout the stage of recovery. Stopford's late results (Platt and Bristow 1923), though presented in a different way, are probably just as good, except for a much lower percentage of recovery of the median nerve.

For a variety of reasons it is desirable that all cases should be followed for at least three years after operation, but the experiences of the last war indicate the difficulties. Frazier (1923) speaks of a "breakdown" of the careful plans of the Surgeon-General when after October, 1919, the care of the American sick and wounded passed from the army, first to the public-health services and later to the War Veterans' Bureau. It is unlikely that any post-war supervision of these cases could be successful in this country without the coöperation of the Ministry of Pensions.

NERVE GRAFTS

At the end of the last war the general opinion was that "nerve grafting should only be adopted as a substitute for end-to-end suture in those very rare instances where it is absolutely impossible to bring about direct approximation" (Medical Research Council committee (1920). Since then successful results have been reported with autografts and to a less extent with other types of graft. In most of these reports the evidence of success is not convincing. Some of the cases reported, however, show unequivocal evidence of recovery. Thus, the Medical Research Council committee, which was evidently sceptical about the value of grafts, examined some cases of J. L. Joyce and others and found clear signs of recovery. In one case, where a gap of 3½ in. in the ulnar nerve in the upper arm had been bridged by the internal cutaneous nerve of the same limb, they found at the end of thirty-nine months good recovery in the flexor carpi ulnaris and flexor profundus, voluntary contraction in the abductor minimi digiti and in the adductor pollicis, and a faradic response in the fourth dorsal interosseous muscle, together with some sensory recovery. They reported also good results in grafted medial and musculospiral nerves. Foerster had in 21 autografts 5 recoveries and 12 cases improved.

Since that time the success of grafts into the facial nerve by the method of Ballance and Duel (1932) has shown that more can be expected from grafts, at least with nerves of small calibre, than was hitherto thought possible. And new methods of suture, particularly suitable for grafting, are also available (Young and Medawar, this issue). For these reasons the possibilities of nerve grafts should be reconsidered. The length of nerve damaged by war wounds is often considerable, and the difficulties of end-to-end approximation after free excision of the proximal stump back to healthy nerve bundles may be great, even after transposition of the nerve. The postural methods employed to bring the stumps together tend to make the postoperative course extremely tedious for the patient and may increase the period of his total incapacity.

The various types of graft and the experimental data about them are discussed by Young, Holmes, and Sanders in this issue. Most of the successful cases have been autografts, usually in the form of a cable of several strands taken from cutaneous nerves.

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FIBRIN SUTURE OF PERIPHERAL NERVES

MEASUREMENT OF THE RATE OF REGENERATION *

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To reduce the difficulties of nerve suture and to minimise the disorganisation of the fibres which is apt to be produced by stitches, even if restricted as far as possible to the epineurium, a method has been devised by which stumps can be held together with concentrated coagulated blood plasma. The method consists simply in holding the cut stumps together and pouring round them plasma which has just been mixed with a little strong tissue-extract. In about ½–2 min., according to the age of the plasma and the strength of the extract, the plasma clots to a firm jelly, which sticks to the nerves and holds the stumps together. The plasma is freely permeable and during the subsequent days is dissolved away, although remaining long enough to allow a firm union to be established between the divided ends.

METHOD

The gel formed by ordinary plasma is not sufficiently strong to maintain union under tension, but it can be fortified by dissolving in it sufficient fibrinogen to increase its normal concentration by anything up to ten times. In the experiments so far undertaken cockerel plasma has proved to be more satisfactory than that of mammals. Blood is withdrawn from the carotid artery through oiled cannulæ into large centrifuge tubes. These are packed in ice for 10 min. and then spun. The supernatant plasma, which separates easily, is stored in waxed test-tubes on ice and keeps for at least six weeks. The animal should be starved for thirty-six hours before operation. A normal yield under ether anæsthesia is 100–150 c.cm. of whole blood. No heparin need be used.

The concentration is effected by the precipitation of fibrinogen (with prothrombin) from part of the plasma and by its re-solution in a smaller volume. The concentration thus concerns the protein constituents only. The method of salting out by half-saturation with sodium chloride is unsatisfactory, because the excess of salt, which cannot be easily removed, interferes with clotting. Accordingly Mellanby's (1917) method is used, 1 volume of plasma being mixed with 9 volumes of redistilled water and then, slowly, with 0·10–0·15 volume of a solution of acetic acid in redistilled water containing 1% by volume. The fibrinogen forms a flocculate, which is centrifuged out very firmly after standing for 5 min. The supernatant fluid is discarded and replaced with water, which is then also taken off with a fine pipette. The fibrinogen may now be either used directly or stored under distilled water at 4° C. It keeps for at least ten days in this condition without changing its properties, except that it becomes progressively more difficult to redissolve.

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Before use, the fibrinogen is dissolved in the appropriate volume of plasma—not in saline, because in the presence of serum the fibrin clot is stronger and much more stable. For use with rabbit nerves a 6 × N concentration has proved satisfactory—i.e., one produced by dissolving in 1 volume of plasma the fibrinogen precipitated from 5 volumes. During the first stage of solution the precipitate becomes hydrated and swells; to prevent it from forming a tough gelated mass, it should be broken up with the tip of a pipette and sucked in and out as rapidly as possible. The entire set of operations, which are rapid and simple, should be performed aseptically and the reagents subjected to routine bacteriological tests for sterility.

The quick and even coagulation of the plasma is ensured by mixing it thoroughly just before application with not more than a tenth of its volume of a concentrated tissue-extract, although such a procedure is not absolutely necessary. Chicken-embryo extract in saline (2 c.cm. per 10-day embryo) is very satisfactory, because it is a powerful clotting agent which is sterile in the first instance. The extract retains almost full potency for a week if it is stored just above 0° C. and the saline is buffered. The slight precipitate which invariably forms after the first day of storage may be disregarded.

RESULTS

The plasma method has been found to give very satisfactory junction of the cut sciatic nerve of the rabbit, even under conditions in which the stumps retract 1 cm. or more from each other. The stumps are held together with fine forceps, and the plasma, after mixing with the embryo extract, is dropped in from a sterile pipette in such a way that it remains as a small pool round the ends. It is desirable to dry the site of application as far as possible with gauze. The forceps are carefully withdrawn through the coagulum which forms; sharp watchmaker's forceps are useful, because they come out easily. Plasma 0·5 c.cm. is a full allowance for the union of the sciatic nerve of the rabbit. Very good apposition of the cut ends can be obtained in this way. To ensure that the ends are held properly in place, the epineurium of both stumps can be gripped with one pair of forceps, which is then fixed with a clip while the epineurium is seized again on the opposite side of the nerve trunk, held together, and clipped. If the junction is for any reason unsatisfactory, it can be broken and remade without any damage to the nerve.

Little or no plasma penetrates between the cut stumps, and no barrier to regeneration is presented. The plasma is usually wholly dissolved away; hence in rabbits opened two or three weeks after operation no trace of it is seen. Small whitish masses sometimes remain after this period, but they do not appear to set up any reaction. To test the possibility of a general reaction to cockerel plasma, 2 rabbits were each injected intravenously with 1 c.cm. of heparinised cockerel plasma a week for six weeks. No detectable response corresponding to sensitisation was seen, and the rabbits remained apparently completely normal.

Experiments on joining the sciatic nerve of the dog have proved a severe test of the plasma method, not so much because of the size of the nerve and the tension between the cut ends as because of the activity of the animal in the days after the operation. These experiments show that it would probably be necessary to restrict movement in the limb for a few days, though no special precautions of this sort have to be taken with the rabbit.

Histological study (figs. 1 and 2) shows that the junctions made by the plasma method are readily crossed by nerve-fibres. It is impossible in any nerve junction to ensure that all the fibres pass straight from the central to the peripheral stump, but in the fibrin junction there is a near approach to this condition, with none of the whorls and deviation of large bundles of fibres which are unavoidable with stitching unless the epineurium alone is sutured—a difficult achievement with small nerves.

RATE OF REGENERATION

To judge the effectiveness of regeneration after different procedures—such as suture and the fibrin method just described—we have measured how far from the point of junction a reflex response can be elicited.

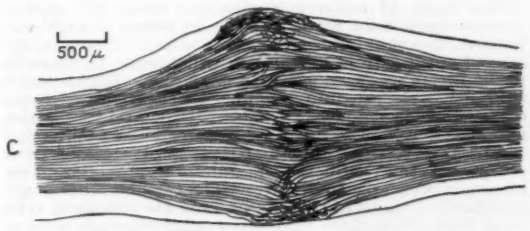

FIG. 1.—Right sciatic nerve of a rabbit. Junction made with plasma twenty-five days previously. The fibres have grown forwards with little deviation except at the edges. C, central stump. This and fig. 2 are tracings from photographs of sections stained by Bodian's method for showing axons.

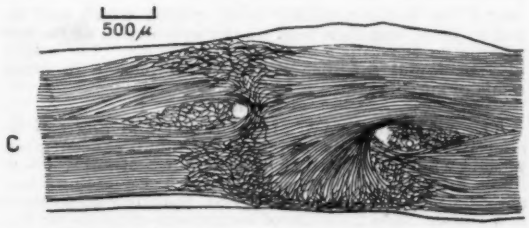

FIG. 2.—Left sciatic nerve of same rabbit as in fig. 1. Junction made with fine silk stitches. The stitches interrupt the outgrowth and the pressing together of the ends produces whorls and deviation of bundles.
C, central stump.

This is most easily done by exposing the nerve under light anæsthesia and by pinching it with fine forceps, first far peripherally and then nearer and nearer to the junction, until the reflex response is obtained. The first response is usually a contraction of the flexors of the same side or a turning of the head. The method thus presumably shows the distance to which pain fibres have regenerated. Stimulation by electrical methods gave results similar to those of pinching, but with the disadvantage that either very strong faradic shocks or long and strong condenser discharges must be used, because the young fibres, being small and unmedullated, are difficult to excite electrically. Because of the spread of the current it is therefore difficult to determine in this way the exact point from which a response can first be elicited; but it can be established that responses cannot be obtained to electrical stimulation from a point peripheral to that at which pinching is effective. In fact the reverse is usually the case.

Study of sections of the pinched region by Bodian's method has shown that the region giving a response when pinched usually contains very few nerve-fibres, and that few or no fibres are found beyond this point. The pinching test therefore gives a sensitive indication of the distance to which the fibres have reached.

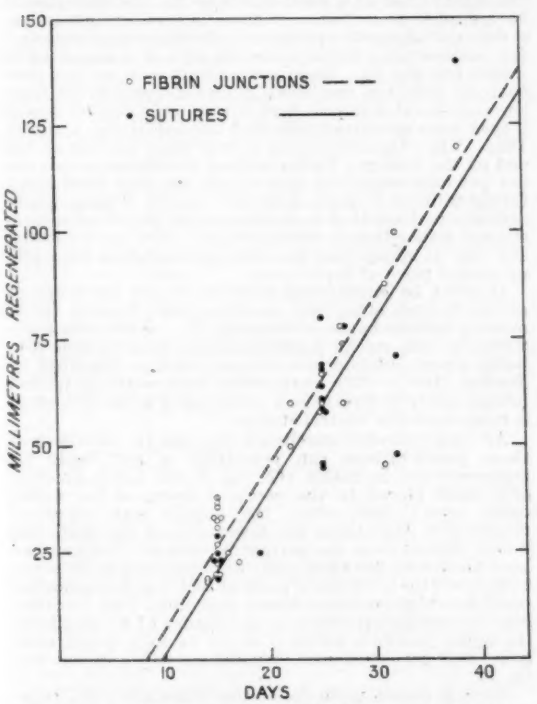

FIG. 3.—Graph showing distances reached by new fibres at various times after stitching the nerves or sticking the ends together with plasma. The lines shown are the regression lines arithmetically calculated. Regeneration begins in the fibrin junctions about a day earlier than in the stitched junctions, and thereafter the rates of growth through the peripheral stump are similar.

With this method it has been found that there is no significant difference between the rates of regeneration of the fibres of the tibial and the peroneal nerves in the rabbit. Moreover the rate of regeneration is very similar between different individuals. The rabbits were usually operated on both sides, the tibial portion of the sciatic being cut in the middle of the thigh and the stumps joined on one side with plasma and on the other with stitches—usually two of fine white silk. Examination was made at various later dates, usually at the fifteenth and twenty-fifth days. Fig. 3 shows that after a latent period the fibres grow out regularly through the peripheral stump. Since the growing region is of constant cross-sectional area, it is reasonable to assume that the growth-rate is constant, and it may therefore be calculated by determining the regression coefficient of distance of outgrowth on age. This has been done separately for the nerves joined by stick and stitch sutures and has given rates of 3·86 and 3·89 mm. a day respectively. The difference between the rates is not significant, and indeed we should not expect that the type of junction would influence the rate of growth in the peripheral stump. It is also possible to calculate the time at which the new fibres first appear in the peripheral stump; this is 8·1 and 9·6 days for the plasma junctions and the sutures respectively. The data so far collected are not sufficient to establish the statistical significance of this difference, but they certainly suggest that the latent period is shorter with the plasma method—i.e., with it the fibres cross the scar more readily than they do after stitching.

The histological studies of Cajal (1928) showed a rate of growth of fibres through the scar of the order of 0·2 mm. a day, which agrees with our estimate of the latent period. Previous estimates of the rate of growth within the peripheral stump have mostly been based on the time of recovery of function—i.e., they do not take separate notice of the delay in the scar or at the end-organ. The figures reported are of the same order as those here found; for instance, Dustin (1917) gives 2–4·5 mm. daily for the ulnaris and 4–5 mm. for the musculospiral in man. One can therefore calculate the time of expected recovery on a basis of ten days or more (according to complications) for crossing the scar and a rate of 4 mm. a day in the peripheral stump. The delay at the end-organ is not definitely known but is perhaps not great.

The rate of growth of the new fibres is not the only criterion of successful regeneration, and the method we have used gives no test of exactness of apposition of funiculi or other factors conducive to successful functional recovery. However, the results of histological examination give assurance that the fibrin method provides junctions even better than those obtainable with stitches, and it may be concluded that the method outlined is effective for the rabbit and dog, besides having the great advantage of rapidity and ease of execution. There appears to be no reason why it should not be used for larger nerves, especially if the stumps can be brought together without undue tension and the limb kept still for a few days after operation. We have found the method very convenient when making nerve grafts in which the ends can be approximated without tension; and it is especially

useful for fixing together cable grafts, which can be put in place and then held by the application of further plasma to the upper and lower junctions. Use might also be found for such concentrated plasma in other fields of surgery.

SUMMARY

The cut sciatic nerve of the rabbit and dog can be effectively joined by applying a liquid concentrated plasma which is allowed to clot round the stumps. New fibres grow slightly faster across such a junction than across a sutured nerve, and good funicular apposition is secured. The distance of outgrowth of axons in the peripheral stump can be determined by pinching the nerve to discover the most peripheral point from which reflex responses can be obtained. It is thus established that in the rabbit after plasma junction the fibres grow through the peripheral stump at the rate of 3·9 mm. a day after a latent period of 8·1 days.

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NERVE REGENERATION

IMPORTANCE OF THE PERIPHERAL STUMP AND THE VALUE OF NERVE GRAFTS

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THE work of Cajal (1928) and others has firmly established that recovery after section of a peripheral nerve depends on the outgrowth of new nerve-fibres from the central stump, but there still remains some uncertainty about the contribution made to the process by the peripheral stump. The cells of the sheath of Schwann in both stumps multiply during the days immediately after section, and in the peripheral stump they then form the Schwann bands or bands of Büngner. It is supposed that the young outgrowing axons pass down these bands; but the exact relationship between the two is still doubtful. Further, it is not known whether the bands are equally able to receive new fibres at all times after section of a nerve, or indeed whether it is essential for regeneration that there be a contribution of Schwann cells from the peripheral stump. Knowledge about the peripheral stump is, however, of the first importance in deciding about operation—e.g., the advisability of delay before attempting suture, and the possibilities of nerve grafts.

SCHWANN OUTGROWTH FROM PERIPHERAL STUMP

That the peripheral stump plays a most important part in making the actual junction is shown by experiments in which the nerves are cut and the stumps allowed to remain separate from each other. Such operations have been done on rabbits, the animals being examined after suitable times and the lengths of the outgrowths from the cut ends measured. Fig. 1 shows the results of some of these experiments. New fibres can undoubtedly grow out from a central stump in such circumstances, advancing accompanied by their own Schwann cells, as in rabbit 182 (fig. 1); but at the same time an outgrowth at least as vigorous, consisting of Schwann cells, takes place from the peripheral stump. This proliferation was called by Nageotte (1922) a peripheral glioma, and the phenomenon has been investigated by Masson (1932).* Such peripheral proliferations do not form mere amorphous masses on the end of the stump but often grow centrally as broad strands of tissue which join up with the central stump (fig. 1, rabbits 206, 24, 67; fig. 2). In this way a new stretch of tissue is built, reuniting the two stumps.

* The question of the distinction between these proliferating Schwann cells and fibroblasts is too complex for discussion here.

The rates of outgrowth observed from the central stumps vary from zero, in cases in which a bulb was formed, to a maximum of 0·4 mm. a day. The average rate of outgrowth of all cases in which some measurable proliferation was seen was 0·2 mm. a day. This is much slower than the rate found for outgrowths from peripheral stumps, which send out strands of tissue at a rate which averages 0·45 mm. a day, and in some cases approaches 1 mm. a day. The extent of these proliferations from peripheral stumps differs from animal to animal, and we have not been able to discover what variable factors are involved. It appears, however, that the Schwann cells grow best when they have some support, such as was provided in some of the experiments by leaving a part of the sciatic nerve uncut (fig. 1, rabbits 125 and 162). When the central and peripheral stumps are left close together, with a gap less than about 2 cm., union between them may take place very rapidly. The average rate for crossing such gaps was 0·77 mm. a day, and the highest rate observed was 1·3 mm. a day where a gap of 20 mm. had been bridged in fifteen days. Though it is impossible in such cases to discover what proportion of the outgrowth comes from each of the stumps, there is reason to believe that the greater part of it comes from the peripheral end. For instance, in rabbit 206 (fig. 1), in which a remarkably rapid union was effected, the strand joining the stumps contained nerve-fibres only to a distance of 5 mm. from the central stump. Since a gap of 15 mm. had been bridged in fifteen days, it is probable that the union had been effected mainly by outgrowth from the peripheral stump, and that when the animal was examined new fibres were just beginning to invade the new path thus made for them.

This great speed of outgrowth of Schwann cells from the peripheral stump when the stumps lie close together suggests that there may be some accelerating and perhaps attracting influence exercised by the central stump on the Schwann tissue growing from the peripheral stump. The possible existence of such a reversed neurotropism has already been hinted at by Nageotte (1922), but with the information at present available its existence cannot be regarded as certain. If there is such an attraction, it does not appear to operate over distances greater than a few millimetres; for instance, no sign of it appeared in rabbit 182 (fig. 1). Moreover we have seen no sign that such an influence can cause Schwann outgrowths from the peripheral stump to turn towards the central stump if they were not already directed towards it (fig. 1, rabbit 182). The outgrowth seems to take place fanwise on the end of the stump. Under certain conditions which are not yet understood one arm of the fan may then reach forwards until it joins with the central stump, whose action is perhaps thus to accelerate the growth of certain strands rather than to attract them. The case of rabbit 104 (fig. 1) shows that the outgrowing bands may join up with a piece of dead tissue.

It must be emphasised that these new stretches of nerve, though often thin at first, later become thick, making definite bands of tissue (fig. 2). Within them the Schwann cells run in parallel strands, and there is probably a new endoneurium, reconstituted as described by Masson (1932). The outgrowths thus make a perfect bridge, ready to receive new outgrowing axons if contact is made with the central stump.

An experimental mischance has shown clearly how these proliferations can constitute a real basis for regeneration: in rabbit 165 (fig. 1) the lower junction of a graft placed in the peroneal nerve of the rabbit came loose; and, when the animal was examined twenty-five days later, the lower end of the graft was 8 mm. distant from the peripheral stump. The gap had been filled with Schwann cells, and by pinching the nerve to discover the most distal point at which reflex responses could be obtained it was found that fibres had travelled into the peripheral stump to a distance of 41 mm. from the upper junction, which is as far as they would have gone had no accidental separation taken place (see fig. 3).

There is therefore no doubt that Schwann cells, growing mainly from the peripheral stump, can effectively bridge gaps between cut ends; but the outcome of regeneration through such newly formed stretches of nerve may be impaired if they do not guide the new fibres into proper paths as effectively as would a true peripheral

stump. However, as already mentioned (Cairns and Young, this issue), it is probable that the arrival of new fibres at appropriate end-organs is always a matter of chance. It remains uncertain how far such proliferations from peripheral stumps assist in the regeneration of human nerves, but there is every reason to believe that small gaps at least can be bridged in this way. This may be one of the explanations of the spontaneous recovery of such a large proportion of nerve injuries, though it must also be remembered that in many cases the nerve may be crushed or bruised without loss of anatomical continuity.

FIG. 2—Long outgrowth of parallel Schwann bands from a peripheral stump left widely separated from the central stump 54 days previously (see fig. 1, rabbit 125). The original peripheral stump is seen on the left. (Tracing from photograph of section stained by Bodian's method.)

NERVE TRANSPLANTS

The fact that outgrowth takes place so actively from a peripheral stump emphasises the importance of the contribution made by the Schwann cells to regeneration, and proper appreciation of this is essential in considering the various types of graft suggested for bridging defects. Experiments such as those of Cajal (1928) and Huber (1895, 1920) clearly prove the practicability of grafts in animals, but there has been some difference of opinion about their value in man. The most uniformly successful grafts have been those of Ballance and Duel (1932) in the facial canal. Their results alone are sufficient to show that, at least in some circumstances, nerve transplantation can be very effective.

Part of the difficulty in assessing the value of grafts arises because there has been no quantitative comparison of the effectiveness of the different types suggested, even in animals. We have made such a comparison by measuring the distance reached by outgrowing fibres after the insertion of grafts of various sorts into the peroneal nerve of the rabbit. The grafts were always pieces of rabbit tibial nerve 2 cm. long and were fixed in place under aseptic conditions with concentrated fibrinogen solutions (see Young and Medawar in this issue). After a suitable time, usually fifteen or twenty-five days, the animal was anæsthetised and the length of outgrowth determined by pinching the nerve from a distal point upwards until a reflex response was obtained. Grafts of different sorts were placed on opposite sides of each rabbit.

Autografts.—To make autografts, portions of the tibial nerve in the thigh were used to fill gaps in the peroneal nerve. The tibial nerve, being the thicker of the two, allows full opportunity for outgrowth of all the peroneal fibres. Fig. 3 shows that new fibres grow through such autografts only slightly more slowly than through a normal peripheral stump. By the fifteenth day they have crossed the upper junction and grown down into the graft; and by the twenty-fifth day they have also crossed the lower junction, apparently without serious delay. The average rate of growth over this whole period is 3·0 mm. a day, which compares favourably with the 3·9 mm. a day through a normal peripheral stump. The calculated average time at which fibres first appear in the graft is 11·1 days—i.e., somewhat later than the 8·1 days in a normal peripheral stump.

Histological study of the grafted pieces by Bodian and Weigert methods shows that they are plentifully supplied with new fibres, and that by the twenty-fifth day these are already provided with myelin sheaths. The Schwann cells of the piece used to make the graft certainly undergo multiplication and form bands of Büngner, though perhaps the proliferation is somewhat less abundant than in a normal peripheral stump.

Predegenerated autografts.—It has been suggested that (Cajal 1928, Tello 1911) that regeneration would be more rapid if the fibres were made to grow into a graft which had been previously cut and allowed to degenerate. Huber (1920), using qualitative tests, has found in rabbits that grafts predegenerated for twenty to thirty days are as good as, but no better than, fresh autografts. Duel (1933) claims, in *Macacus*, with predegenerated nerves a regeneration quicker by half than that given by fresh grafts, but Bentley and Hill (1936) have not been able to confirm this in cats.

Our results show that there is little difference between the rates of regeneration through predegenerated and through normal autografts. Fig. 3 shows that the fibres have in some cases penetrated further into the predegenerated grafts than into any of the autografts, but this difference is not constant or statistically significant from the figures which we have so far obtained. The times of predegeneration used vary from six to twenty-eight days, but there is insufficient evidence to show whether the time of predegeneration influences the result. These results make it clear that any influence of predegeneration on the rate of regeneration could at best be slight and not sufficient to make predegeneration desirable as a surgical procedure.

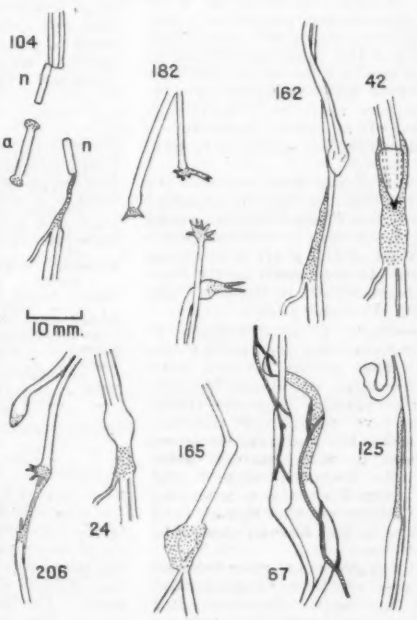

FIG. 1—Outgrowth from cut stumps of rabbits' nerves under various conditions. New tissue shown stippled. Upper stump central, lower peripheral.
Rabbit 104: 21 days; two pieces of alcohol-fixed nerve (*a*) and an autograft (*a*) were placed between the stumps but not attached to them; there has been outgrowth from the peripheral stump and from both ends of the autograft but not from the central stump.
Rabbit 182: 21 days; pieces removed from the nerves to leave gaps; tibial peripheral stump turned sideways; no sign of attractive influences or directed outgrowth, proliferation from deviated stump proceeds straight forwards from its end.
Rabbit 162: 23 days; tibial nerve cut and a section removed; central stump injected with a 10% solution of beryllium nitrate as an inhibitor; from the peripheral stump a large Schwann outgrowth proceeds along the uncut peroneal nerve.
Rabbit 42: 41 days; whole sciatic nerve cut and its central stump enclosed in a cap of collodion; abundant Schwann outgrowth surrounding the cap; nerve-fibres, not shown, have grown out on the edge of the cap and reached peripheral stump.
Rabbit 206: 15 days; whole sciatic nerve cut and tibial central stump turned aside; very little outgrowth from tibial central stump, but peroneal stumps have been joined.
Rabbit 24: 35 days; whole sciatic nerve cut and allowed to retract; stumps have been joined by Schwann tissue.
Rabbit 165: 25 days; autograft placed in peroneal nerve; lower junction has come loose but has joined up again with peripheral stump through new tissue.
Rabbit 67: 25 days; part of tibial nerve taken to make autograft in peroneal nerve; a new strand has been formed joining the cut tibial stumps; note vascularisation of graft and of Schwann outgrowth.
Rabbit 125: 54 days; tibial nerve cut and its central stump injected with iodine in a 90% solution of alcohol and turned back; from the peripheral stump there has been extensive Schwann outgrowth alongside the peroneal nerve.

Homografts.—From the few fresh homografts which we have tried in our experiments it appears that regeneration proceeds through these as well as through autografts, though further data will be required before this conclusion can be regarded as certain.

Stored homografts.—The use of nerves taken at amputation or after death has been advocated, if necessary with storage on ice (Bethe 1916) or in petroleum oil (Dujarier and François 1918). Huber (1920) found such grafts satisfactory in animals. There seems to be no obvious reason for

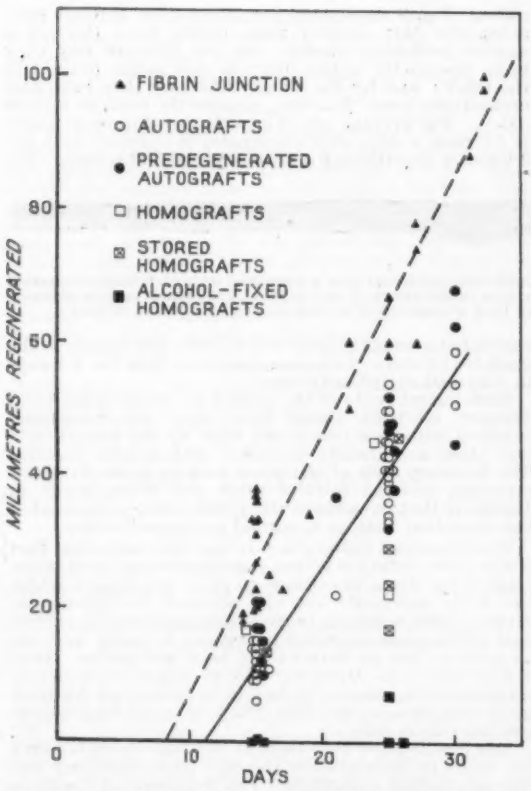

FIG. 3—Graph showing distances reached by regenerating fibres after simple fibrin junction and various sorts of grafts, each 2 cm. long. The rate of growth through autografts (continuous line) is not much less than after simple suture (broken line).

using storage in oil, and we have preferred to try storing rabbits' nerves in Ringer's solution at 2° C. Fig. 3 shows that some of these stored pieces have conducted new fibres as well as fresh autografts, and these (the point at fifteen days and the uppermost point at twenty-five days) were cases in which the nerve had been kept for seven days. The three lower points at twenty-five days were cases of nerves kept for twenty-one, twenty-four and thirty-two days, and regeneration through these has been considerably less satisfactory than through autografts.

These preliminary results indicate that satisfactory regeneration through stored grafts can only be obtained if the cells of the graft remain alive (Tello 1912), as would be expected on the general thesis that an active contribution from the Schwann cells of the graft is essential for satisfactory regeneration. In man such grafts have proved less satisfactory than autografts in the few cases in which they have been tried (Foerster 1929).

Alcohol-fixed homografts.—There is a difference of opinion about the effect of transplanting dead nerves into animals. Cajal (1928) says that nerves treated with chloroform, boiling water, formalin, or chloral hydrate or by desiccation are not innervated. Nageotte (1922) and Huber (1920), however, have found that alcohol-fixed grafts are successful in animals; and some successes have been claimed for them in man, though most surgeons have condemned the method. Gosset and Bertrand (1935, 1938) have claimed success in man and animals with alcohol-fixed grafts of the spinal cord of cats or rabbits; however, in the human cases the evidence given was not complete.

Fig. 3 shows that alcohol-fixed grafts are poor vehicles for new fibres. In only one case was there evidence that fibres had passed beyond the upper junction, and histological study showed that here fibres were passing down along the outside of the graft rather than within it. These experiments therefore support the clinical figures in showing that alcohol-fixed grafts should not be used.

Conclusion about use of grafts.—These quantitative results show that a fresh autograft provides for the growth of new fibres a medium which is only slightly less satisfactory than a normal peripheral stump. The method used, however, tests only the rate of outgrowth and not the extent to which new fibres reach appropriate end-organs. The presence of two junctions when a graft is employed might decrease the chance of a satisfactory end-result. However, as has already been emphasised, the achievement of this is probably largely a matter of luck in all nervous regeneration. A nerve of relatively simple composition, such as the musculospiral, will probably recover well, and a more complex nerve less well, whatever procedure is employed, and the use of grafts to bridge gaps in suitable cases should be carefully considered, especially with the simpler nerves.

Since it seems that successful regeneration depends on the active contribution of the living Schwann cells of the peripheral stump, it is essential that the graft be treated as a living thing and not pinched with forceps, dried, or otherwise maltreated. Fresh autografts are likely to provide the most successful results, and, on the available evidence, it does not seem worth while to go to the trouble of predegeneration. Storage of homografts for a short period is not excluded. The use of fresh heterografts has never been thoroughly explored and has been found unsuccessful by some (Cajal 1928). We have not so far tested the capacity of heterografts quantitatively, but Huber (1895) grafted the sciatic nerves of cats on to dogs with great success, and Blondin (1928) reported successful results in man with fresh dog grafts up to 10 cm., in cases whose recovery was carefully studied by Dr. Alajouanine.

The success of the thin Ballance-Duel grafts suggests that small nerves may make better grafts than large nerves, and a cable graft of several thin strands is probably better than a single thick graft, which in any case is difficult to obtain. The concentrated plasma described in this issue is especially useful for the preparation of cable grafts; the separate strands can first be made into a bundle with plasma and then the whole bundle fixed in place, without the necessity of numerous stitches.

Although grafting has not always yielded satisfactory results in the past, there are sufficient indications to show that it can work in man. For instance, out of 21 autografts Foerster (1929) had 5 cases which recovered completely, including 2 in the ulnar nerve; 12 which were ameliorated; 2 failures; and 2 cases not traced. The experimental results are encouraging and seem at least to justify trial of the method in a group of suitable cases in which approximation of the stumps cannot be obtained without stretching.

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". . . The spirit of science is elusive and as light as thistledown; it is not to be hunted with a bludgeon, it is to be wooed as the poet's muse. Should it find its way into the scientific departments of an institution, there is no limit to the influence it may have. The spirit of science ennobles as no baser passion can, and its light touch may transform the laboured efforts of routine service into a life dedicated to that noblest of all quests, the search after truth for its own sake."—Dr. Keith Inglis in the *Medical Journal of Australia*, May 4, 1940, p. 612.

SMALL-SCALE FILTRATION OF CITRATED PLASMA

BY S. R. M. BUSHBY; G. A. H. BUTTLE, M.R.C.S.
AND
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(*From the Army Blood-Transfusion Service*)

THE fact that British forces have operated or been assembled in regions where they could not be supplied with stored blood from the home depot of the Army Blood-Transfusion Service rendered necessary the provision either of plasma or serum for the treatment of wound shock. Citrated plasma was chosen. Filtration of such plasma is desirable, but this, when either a Seitz asbestos pad or a Berkefeld candle is used, raises the inherent difficulty of clotting, both during and after filtration. The method described here is admittedly laborious and extravagant in filter pads, but it requires very little laboratory equipment and is therefore useful for small hospitals wishing to obtain their own stocks of clean plasma. The method also provides a citrated plasma rich in protein. Dilution of citrated plasma with either citrate anticoagulant beforehand, or physiological saline after collection renders filtration easier and reduces clotting difficulties in proportion to the amount of dilution; but the plasma is correspondingly poor in protein. Experimentally, such diluted samples have a blood-replacement value equivalent to the protein content and transient so far as the saline diluent is concerned.*

When blood is collected by the Army technique, the pint bottle contains 440 c.cm. of blood diluted with 100 c.cm. of a 3% solution of sodium citrate. The final yield from this consists of approximately 300 c.cm. of diluted plasma, of which 100 c.cm. is citrate. Citrated plasma from other sources—e.g., from the Emergency Medical Service—has until recently been more dilute, because of the larger quantity of anticoagulant used.

PLASMA FILTRATION WITH SEITZ PADS

With a 14 cm. Seitz filter, a negative pressure of 20–25 mm. Hg, and a S.B. Sterilmat pad, approximately 500 c.cm. of plasma can be filtered without any clotting. Very soon after this amount has been exceeded clots begin to appear in the filtrate; and, if as much as 1500 c.cm. is filtered, the pad becomes completely blocked with clot. The secret of successful filtration is to carry out the operation as quickly as possible, so that the plasma is in contact with the asbestos for the minimum of time. The speed of filtration, and thereby the amount that can be filtered, can be increased by preliminary clarification of the plasma, by wetting the pads before they are autoclaved, by washing the pad with sodium-citrate solution before and between filtration of amounts of about 500 c.cm., and by using a combination of positive and negative pressures. All of these manœuvres are incorporated in the detail of the process described below.

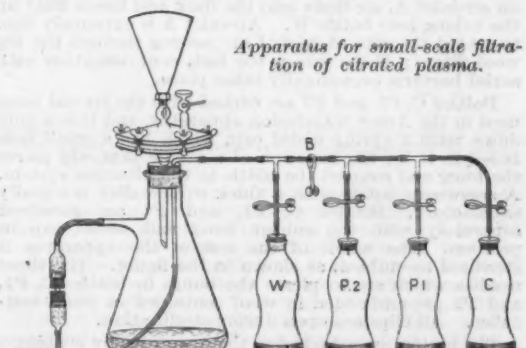
FACTORS CONCERNED IN CLOTTING

Pure crystalline asbestos (Gooch fibre) does not cause clotting, but the fibrous asbestos used in Seitz filter pads causes fresh plasma to clot rapidly. This clotting and non-clotting distinction between fibrous and crystalline asbestos has been found without exception in the large number of samples examined by us. When a small portion of Seitz pad is broken into fresh plasma, clotting first takes place round the pieces, and the process is not complete for an hour or so. Crude asbestos boiled in 2N nitric acid and afterwards thoroughly washed in water does not cause clotting; boiling with 2N hydrochloric acid is not nearly so effective with most samples of asbestos. The boiling of asbestos with 2N caustic soda, with a 30% solution of sodium citrate, with 25% solution of potassium oxalate, and with water does not remove the clotting power; nor does treatment with 2N nitric acid at 80° C. for an hour.

One apparently simple solution of this problem is to prepare an efficient filtration mat either from crystalline asbestos such as Gooch fibre or from fibrous asbestos which has been boiled with 2N nitric acid; but this presents considerable technical difficulties in the preparation of a sterilising pad. Excess of sodium citrate or of potassium oxalate will not prevent the clotting, which is caused by contact with asbestos, but the addition of heparin (10 mg. per 100 c.cm.) to the plasma is effective. The action of heparin in preventing clotting suggests that it is an excess of calcium ions or of magnesium ions in the asbestos which is responsible for the clotting, but this cannot be the complete explanation, because excess of either citrate or oxalate does not prevent clotting. It is clear, however, that, if clotting is due to a metallic ion, this is not extremely soluble, because only that plasma which is in direct contact with the asbestos tends to clot.

METHOD OF FILTRATION

Absorption.—The citrated blood is pooled in large Winchester-quart bottles, one part of group-B blood being mixed with ten parts of group-A blood. The mixture may be left in the refrigerator for four days to allow cross-absorption of agglutinins and settlement. The supernatant plasma, which is free from agglutinin, is then siphoned off. Alternatively, and more quickly, the pooled blood may be allowed to absorb for not more than two hours and then be separated in an Alfa-Laval serum separator, type S3, S4, or S5, according to the output required.



Apparatus for small-scale filtration of citrated plasma.

Clarification.—The plasma obtained by either of these methods is first clarified crudely by passage through cotton pulp. Complete clarification is accomplished by filtration through an F.C.B. Seitz pad. These pads vary greatly in speed of filtration; but, if they are well wetted before being autoclaved, the speed is increased without detriment to the clarifying action. In practice, 100 c.cm. of a 3% solution of sodium citrate is passed through the pad. This is followed by 500 c.cm. of plasma. Between each 500 c.cm. of plasma 100 c.cm. of a 10% solution of sodium citrate, followed by 100 c.cm. of a 3% solution of sodium citrate, is passed through the pad. The amount of plasma which can be filtered through a pad is 2000–4000 c.cm. and depends on the speed of filtration. If the speed is slower than 500 c.cm. in ten minutes, clotting usually takes place. If a well-packed pulp is used the second process can be omitted.

Sterilisation.—Sterilising filtration pads (S.B.) cannot be autoclaved while wet, and it is therefore impossible to accelerate the rate of filtration by this manœuvre. Speed may be increased by exerting positive pressure with a proper pressure chamber, and this is essential when large pilot filters are used. With a 14 cm. filter and only negative pressure, not more than 1000 c.cm. can be passed through each pad, but with positive pressure 2 litres can be filtered. The citrate washing, as described above for clarification, must be used between each 500 c.cm. of plasma filtered.

* Kekwick, A., personal communication, 1940.

Plan, assembly, and sterilisation of apparatus.—The filtration system and the bottle-filling system are both one and are both completely enclosed (see figure). Evacuation is carried out with a water pump or an Atmozon pump. The tube from the pump contains a T-piece which connects the pump with the filtration-fiilng system, and the system with the air, through a fine air-inlet, A; this last connexion is controlled with a clip. Air, if admitted, passes through two large cotton-wool filters before reaching the big vacuum flask. The vacuum flask admits the filtrate from the Seitz filter, and an exit tube, reaching to the very bottom of the flask, connects it with a wash bottle, W; two bottles designed to be filled with filtered plasma, P1 and P2; and a control bottle containing peptone broth, C. Any or all of these bottles can be put into communication with the vacuum flask by opening the appropriate clip. The clip B is especially convenient for cutting out bottles P1, P2, and C at one operation.

When the vacuum flask is exhausted during filtration, any of the attached bottles can be exhausted at the same time by opening the appropriate clip, and the filtrate in the vacuum flask can be transferred to that bottle by releasing the vacuum in the flask. For instance, if the clip on bottle W is opened during filtration and the other clips are closed, the bottle W develops a negative pressure. When the pressure is released by opening the clip on air-inlet A, air flows into the flask and forces fluid up the tubing into bottle W. Air-inlet A is extremely fine, to retard the rate of flow of air passing through the big wool filters; if the rate is too fast, contamination with aerial bacteria occasionally takes place.

Bottles C, P1, and P2 are corked with the special bung used in the Army transfusion apparatus, and this is held down with a spring metal cap, which has a small hole bored in it for the insertion of a needle that will pierce the bung and connect the bottle to the filtration system. A screw-cap bottle with a thick rubber disk is equally satisfactory. Bottles C, P1, and P2 are sterilised separately with the rubber bung and metal cap in position. The whole of the rest of the apparatus is sterilised assembled, as shown in the figure. The three needles which are to pierce the bungs in bottles C, P1, and P2 are embedded in wool contained in small test-tubes. All clips are open during sterilisation.

The bottles are attached to the apparatus by pushing a needle through the hole in the metal cap and so through the bung. A small drop of methylated spirit is placed on the hole in the cap and, when this is ignited, the needle pushed through it. Care must be taken not to heat the needle enough to burn the rubber bung; otherwise the needle track will not be self-sealing when the needle is finally withdrawn. For the same reason needles cannot be autoclaved already in position passed through the rubber bung. When a needle is withdrawn from a bung, a drop of glycerin containing 1% of phenol is placed on the hole to act as an antiseptic, lest a capillary track of plasma should permit bacteria to grow through the bung into the bottle.

Procedure.—The pad is first washed through with 100 c.cm. of a 3% solution of sodium citrate in distilled water; the clip connected to the wash bottle, W, is opened and clip B closed to prevent the tubing of the plasma bottles from becoming filled with citrate solution. The washings are transferred into bottle W by opening the air inlet, A. Next, 500 c.cm. of plasma is filtered as rapidly as possible with a negative pressure of 25 mm. Hg; clip B and the clip attached to bottle P1 are opened; all other clips are kept closed. After the plasma has been transferred to bottle P1, a few c.cm. is transferred to bottle C, and the filter immediately washed with 100 c.cm. of a 10% solution of sodium citrate followed by 100 c.cm. of a 3% solution of sodium citrate. The washings are transferred to bottle W.

Two important points must be remembered during this process: (1) only those clips which control the bottle into which the fluid is to be transferred should be open, and, if the bottle is evacuated before filtering, the frothing produced by the air drawn from the bottle is minimised; (2) the plasma must not be left in contact with the pad a moment longer than necessary; the citrate should instantly follow the plasma and the rate of filtration be kept at the maximum.

After washing, a further 500 c.cm. of plasma is filtered and transferred to bottle P2. A control test of the efficiency of the filtering pad is then made by passing 100 c.cm. of a 1% solution of glucose broth heavily contaminated with *Chromobacterium prodigiosum* and transferring the broth into bottle C. This bottle therefore contains samples of both bottles of plasma and of the control broth. It is incubated for five days and observed daily. Should it grow any bacteria, the plasma, which meantime has been stored in the refrigerator, is immediately refiltered. The neck and cap of the bottle of plasma are finally covered with a Viscap.

The above procedure is suitable for producing small stores of plasma with simple and relatively inexpensive apparatus. Even with all these precautions a number of bottles slowly develop clots. But this does not seem to matter from the therapeutic aspect and from the mechanical point of view the clot can be aerated by shaking the bottle so that it floats out of the way of the exit tube during administration.

SUMMARY

(1) Filtration of citrated plasma for the purpose of sterilisation usually causes clotting.

(2) Clotting is due to some unknown factor in crude asbestos, which is removed by treatment with 2N nitric acid. Pure crystalline asbestos (Gooch fibre) does not cause clotting.

(3) A limited amount of citrated plasma can be filtered through crude asbestos pads without clotting, provided that the speed of filtration is sufficiently rapid and that the pad is washed with citrate from time to time.

(4) A plan of apparatus and a detailed description of technique are given.

Our thanks are due to the Medical Research Council, who at short notice obtained on loan for us large numbers of 14 cm. Seitz filters; to Messrs. Ford's Paper Mills for much helpful advice and original work; and to the Lister Institute for the loan of a big Seitz filter.

POST-MORTEM CÆSAREAN SECTION

WITH A LIVING CHILD

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POST-MORTEM cæsarean section has been performed since the days of the ancients, and the Romans passed a law compelling the performance of this operation whenever the mother died during the later weeks of pregnancy. What success the ancients obtained is not recorded, but in modern times the number of infants saved is small. Munro Kerr reports five cases with only one live fœtus, and he quotes Priessecher who had nine cases with two live infants. The opportunities for this operation are few, and success can only be obtained if the surgeon can reach the patient within a very few minutes of death. One reason for reporting this case is the possibility of more frequent opportunities in air-raid casualties, the only equipment necessary being a sharp scalpel or pen-knife.

A woman aged 30, who had had one normal confinement, was admitted with eclampsia and cerebral hæmorrhage. She is said to have been quite well during pregnancy, and suddenly to have developed two or three fits and become unconscious. On admission she was deeply unconscious and had a right hemiplegia. The blood-pressure was 176/90. The uterus was the size of a 32-weeks pregnancy, and the fœtal heart-sounds were strong. The patient died four hours after admission without regaining consciousness. She was seen a few minutes (2–7) after death, and the fœtal heart was then heard beating very slowly but quite clearly. Cæsarean section was at once performed, the infant weighing 3 lb. 10 oz. The infant was born in blue asphyxia, but recovered quickly with lobeline, oxygen and carbon dioxide. It was fed on breast milk and modified cow's milk, and was discharged from hospital weighing 5 lb. 10 oz. The infant was adopted by friends of the family, and now, at a year old, is a happy and healthy infant.

The fact that this child could be saved in a case of severe eclampsia is encouraging for the prognosis when a healthy mother dies from an accident.

REDUCTION OF DUST-BORNE BACTERIA BY TREATING FLOORS

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IN recent years much attention has been given to physical and chemical methods designed to prevent or limit the spread of air-borne infection. An editorial in THE LANCET of July 6 has drawn attention to these methods, and to the fact that, in addition to droplets or droplet nuclei, bacteria may be suspended on particles of dust from floors, furnishings and bedclothes.

The majority of dust-borne bacteria are relatively resistant to the bactericidal action of ultraviolet light and chemical aerosols (Twort et al. 1940). It is therefore apparent that these methods of air sterilisation are unlikely to be effective unless dust is adequately dealt with at the same time.

The streptococcal cross-infections so often encountered in wards probably depend, in many instances, on direct contact (Allison and Brown 1937) or on the transmission of droplets. That dust, nevertheless, is an important factor has been known for many years (see Kirstein 1902). More recently White (1936) and Cruickshank (1938) have shown that hæmolytic streptococci in dust may remain viable and probably pathogenic for at least several weeks. Streptococcal cross-infection in wards therefore offers a very suitable opportunity for the study of air sterilisation. It is obvious that present conditions give a special importance in hospital wards to methods capable of reducing the numbers of pathogenic bacteria in the air.

This work was undertaken to determine whether pathogenic streptococci can persist on the dust of blankets and floors, and whether simple methods for reducing the amount and infectivity of the dust can be devised.

PERSISTENCE OF HÆMOLYTIC STREPTOCOCCI ON BLANKETS

Use was made of three strains belonging to Lancefield's groups A, B and C. One (group C) was used mainly in large-scale experiments in rooms. It was isolated by Mr. R. E. Glover from the nasal exudate of a ferret infected with influenza virus and was shown by him to be recoverable from blankets for at least two weeks after these had been impregnated with infected nasal secretions. The second strain belonged to group A, the group responsible for the majority of streptococcal infections in man. It was isolated from a case of puerperal sepsis and was used only in small-scale experiments in a sealed tank. This strain (group A, type 25) was kindly supplied by Dr. R. Cruickshank. The third (Aronson) strain, a mouse-virulent group B, was obtained by the kindness of Dr. F. Griffith. It had been dried in vacuo in mouse blood after its virulence for mice had been increased by repeated passage, and stored at refrigerator temperature.

Autoclaved woollen blankets were impregnated by spraying them with 5–10 c.cm. of a serum broth culture of streptococci from a scent spray. They were left to dry overnight at 37° C. or at room temperature. The blanket to be tested was then hung in the centre of an unfurnished room of 1000 cu. ft. capacity and given five to twenty firm strokes with a carpet beater. Blood-agar plates were exposed in the room at heights of 2 and 5 ft. above the floor for a ten-minute period immediately after beating. The precautions observed while performing these experiments included the wearing of cotton gowns, gum boots, dust respirators and waterproof caps. Caps and gowns were sterilised by autoclaving after each experiment. For experiments with the group-A strain strips of blanket about 6 by 18 in. were used and the tests performed in a sealed galvanised-iron tank of 10 cu. ft. capacity.

The results of tests with all strains have so far indicated that viable streptococci in large numbers can be recovered from the air of rooms in which artificially infected blankets have been beaten. The average counts of plates exposed in the room varied from 100–700. In a typical experiment with the group-B streptococcus, in which the infected blanket was beaten twenty-four hours, ten days and four weeks after impregnation, the average plate-counts were 701 after twenty-four hours, 294 after ten days, and 98 after four weeks.

A few attempts to recover hæmolytic streptococci from hospital blankets from surgical and scarlet-fever wards have failed. It may be that this failure can be attributed to the extremely large numbers of other bacteria present. These have been mainly staphylococci, of which some produced hæmolysis on blood-agar plates, large numbers of aerobic spore-bearing bacilli, and *Bacillus proteus*. As many as 2000 organisms per plate have been recovered during the first ten minutes after beating a single blanket.

TABLE I—VIRULENCE OF STREPTOCOCCI (GROUP B) RECOVERED FROM BLANKET TEN DAYS AFTER IMPREGNATION

Control			Test		
24 hr. plate-culture of Strep. B from stock dried in vacuo			24 hr. plate-culture from blanket infected with Strep. B		
Bacteria injected	Mice inoc. i.p.		Bacteria injected	Mice inoc. i.p.	
	Dead in 48 hrs.	Survived		Dead in 48 hrs.	Survived
82	3	1	40	4	0
8	4	0	4	4	0
0·8	4	0	0·4	2	2
0·08	1	3	0·04	0	4

The numbers of bacteria inoculated into mice were calculated from blood-agar plate-counts using the technique described by Miles and Misra (1938).

Tests to determine whether the organisms recovered from blankets have maintained their virulence have only been performed with the B (Aronson) strain. The result of virulence tests with organisms recovered from a blanket twenty-four hours and ten days after its impregnation is recorded in table I. In ten days there was no appreciable reduction in the virulence for mice. The bacteria recovered from the blanket after four weeks showed only a slight reduction in their virulence for mice.

CONTAMINATION OF AIR BY STREPTOCOCCI DEPOSITED IN FLOOR DUST

The purpose of these experiments was to study the contamination of the air of a room by bacteria deposited on the floor in dust, and the possibility of preventing or reducing such contamination by applying a dust-laying preparation to the floor.

Experiments were performed in two rooms equal in size and shape. The floors were covered with linoleum which was thoroughly washed and allowed to dry. The floor of one room was treated with the dust-laying substance to be tested and the other was left as a control. A dusty blanket heavily impregnated with streptococci (group B or C) was suspended in each room and beaten vigorously, plates being exposed for ten minutes immediately after beating to determine the relative numbers of streptococci distributed into the air of the two rooms. Half an hour was allowed for the dust and bacteria to settle to the floor, after which both rooms were thoroughly ventilated for five minutes. A second series of plates was exposed for ten minutes after ventilation to determine the number of bacteria still remaining in the air. Both rooms were then swept for one minute with ordinary household brooms which had been sterilised by autoclaving. Plates were exposed for ten minutes during and after sweeping.

Satisfactory results were obtained in our initial experiments with a proprietary preparation "Florigene," the exact composition of which is unknown to us. Equally satisfactory results have been obtained with a crude liquid paraffin—spindle oil—which is extensively used in the cotton mills in this country, and is therefore readily available in large quantities at a low price.

The results of a typical experiment are shown in table II. This shows that sweeping of the dry dusty floor of the control room resulted in the redistribution into the air of

a large proportion of the bacteria deposited on it. On the other hand, treatment of the floor with a substance such as crude liquid paraffin greatly reduced the aerial contamination which otherwise accompanied sweeping.

TABLE II—EFFECT OF FLOOR TREATMENT ON THE NUMBER OF STREPTOCOCCI (GROUP C) RAISED INTO THE AIR BY SWEEPING

Exposure of plates	Control room: Floor untreated		Test room: Floor treated with spindle oil	
	Ht. of plates above floor (ft.)	Av. count	Ht. of plates above floor (ft.)	Av. count
10 min. after beating	2	426	2	435
	5	312	5	557
10 min. after ventilating	2	2	2	4
	5	2	5	2
10 min. during and after sweeping	2	73	2	8
	5	99	5	0

A striking difference was noticed in the appearance of the dust swept from the floors of the two rooms. The control room gave the usual dry, powdery dust, but that from the test room was sticky and "matted." The importance of this observation lies in the fact that the "matted" dust, while still containing viable organisms, remains on the floor and does not break up into fine particles to be resuspended during sweeping.

The amount of oil required to produce the desired effect on the floors is very small, and although they are a little slippery for the first twenty-four hours after application the oil then soaks in, leaving a dull surface. Although not oily in appearance, the surface remains effective for at least ten days, even if it is washed once or twice with lysol and water. Without washing the effective period would probably be much longer.

The oily substances tested do not in themselves possess appreciable bactericidal power. Numerous attempts have been made to incorporate antiseptics with the oil. Of the antiseptics tested in this way the majority, including phenols, cresols, thymol and carvacrol derivatives, entirely lost their germicidal power when mixed with the oil. A few, such as mercuric chloride and iodine, while retaining their antiseptic properties in the oil, are impracticable because of toxicity, expense, or discoloration of the floors. Dust swept even from treated floors must therefore be regarded as a potential source of infection and should be disposed of suitably.

CONCLUSIONS

This prelimary report is published now to draw attention to a simple measure which may help to control dust-borne infection. At present there appears to be no obvious, simple and adequate method of preventing the formation of dust from blankets and clothing, or of rendering the bacterial flora of this dust innocuous. On the other hand, the treatment of floors in such a way as to reduce the number of organisms which are thrown up into the air every time the floor is swept appears to be quite practicable. We would make this the occasion for a plea for dull "sticky" floors capable of laying dust, in preference to the highly polished surfaces which are the pride of most ward sisters.

SUMMARY

Viable streptococci can be recovered from the air of rooms in which blankets artificially infected with streptococci have been beaten. Streptococci retain almost their full virulence in blankets for four weeks.

Sweeping a dry dusty floor redistributes into the air a large proportion of the bacteria deposited on it, but the application of crude liquid paraffin before sweeping greatly reduces the aerial contamination. Ward floors should therefore be "sticky" rather than highly polished.

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A CASE OF HEAD TETANUS

By E. C. B. Butler, M.B. Lond., F.R.C.S.
ASSISTANT SURGEON TO THE LONDON HOSPITAL

Head tetanus may develop after any wound of the head or face. It is characterised by the classical signs of tetanus coupled with a paralysis of one of the motor cranial nerves. This is due to a toxic neuritis, and the facial nerve, because of its wide distribution, is most commonly affected. The paralysis may come on one or two days before the spasms start, and it has been observed that in spite of the neuritis contractions often occur in the muscles supplied by the affected nerve (Burrows, H. *Lancet*, 1917, **2**, 971). The course of the disease is often very severe and the prognosis grave.

Owing to the rarity of this condition in civilian practice I am reporting this case in the hope that others may be recognised at an earlier stage before the toxins become fixed in the central nervous system.

A man, aged 30, was admitted to hospital with severe cellulitis of the right side of the forehead. Seven days previously a piece of bone had shot out of a machine at which he was working and lacerated his forehead. Next day his forehead started to swell and it became increasingly painful until his admission. On examination he had a septic abrasion on his right temple and there was considerable œdema of the supraorbital region and upper eyelid. The right preauricular glands were swollen. His temperature was 101° F. and pulse-rate 100. Treatment consisted in fomentations locally and Proseptasine by mouth in the usual doses. At the end of four days his swelling had nearly gone but the wound was still discharging slightly and the glands were palpable. Seven days after admission and fourteen after the accident he suddenly developed a complete right Bell's palsy. No other nerves were involved and he did not complain of any stiffness of the face. Next morning he said his face felt stiff and very rapidly he developed symptoms of severe generalised tetanus. Under an anæsthetic I excised the lesion on his forehead and tetanus bacilli were found in it at the London Hospital. I gave him 20,000 units of antitoxin intrathecally, 80,000 intravenously and 20,000 intramuscularly. His convulsions were so severe that he had to be kept under the influence of rectal Avertin. Next day he was much worse and he died that night, sixteen days after infection with the tetanus bacilli.

The interesting features of this case are as follows. (1) The severity of the cellulitis preceding the tetanus, which acted as a red herring. (2) The onset of the Bell's palsy at least twenty-four hours before the first symptoms of tetanus. I was not aware before of this latent period and antitoxin at this stage might possibly have influenced the course of the disease. (3) The severity of the symptoms and early death despite the relatively long latent period of fourteen days between the infection and the onset of symptoms.

KOPLIK SPOTS IN THE COLON

By F. G. Hobson, D.S.O., D.M. Oxfd, F.R.C.P.
PHYSICIAN TO THE RADCLIFFE INFIRMARY AND COUNTY HOSPITAL, OXFORD

The classical example of the opportunities which an accident may create for the observation of the behaviour of the intestinal tract is provided by the story of Alexis St. Martin and William Beaumont. Since the days of Beaumont surgery has yielded innumerable opportunities for the direct inspection of almost all the viscera, and the evidence obtained has been a salutary corrective to many theories and practices which had come to be generally accepted. On rare occasions an isolated observation may throw light on a pathological process which has been assumed or suspected but never before actually seen. The following case is an example.

A man of 31 had suffered since the age of 16 from an intractable colitis, and when 27 his appendix was removed for acute appendicitis. In the following year he developed acute intestinal obstruction with perforation of the colon for which an iliac colostomy was performed. By judicious dieting and the use of abundant charcoal the patient then led

an active and useful life with a minimum of discomfort. About July 6, 1940, he developed measles in a severe form, the attack being marked by a high temperature which exceeded 104° F. at the height of the infection, and an unusually coarse macular rash. The Koplik spots on the mucous membrane of the cheeks and soft palate were abnormally profuse and bigger than a pin's head. The most interesting feature of the attack was that the mucous membrane of the colon where it presented through the colostomy was also covered with Koplik spots, which appeared synchronously with those in the mouth and faded with them and with the cutaneous eruption. Recovery was uneventful and there was no diarrhœa, probably because the patient continued his normal practice of taking large doses of charcoal.

A gastroenteritis and diarrhœa are common in the course of measles, and may become serious complications. Symptoms of acute appendicitis are also familiar to clinicians who see many cases of measles, although the symptoms rarely call for surgical interference and a suppurative appendicitis is uncommon. Wegelin (1937) records three cases of appendicectomy with uneventful recovery which were performed in children who developed acute appendicular symptoms in the prodromal or earliest eruptive stage of measles. He comments on the mildness of the inflammatory changes found on microscopical examination, and refers to the histological investigation of the tonsils in early measles carried out independently and almost concurrently by A. S. Warthin and W. Finkeldey in 1931. These workers found characteristic giant cells in the tonsillar tissue, and in 1932 M. Herzberg demonstrated similar giant cells in the mucosa of the appendix removed from measles patients. Identical giant cells were found in the lymphatic tissue of the appendix in all three of Wegelin's cases. Broadhurst, Maclean and Saurino (1937) describe the occurrence in measles of characteristic inclusion bodies in the ciliated and columnar epithelial cells of the nose and in the globoid basal cells of the Koplik spots. It was unfortunate that in the case here reported the opportunity was missed of securing a biopsy of the lesions in the colon, which presumably were located in the discrete lymphoid nodules of the mucous membrane.

This isolated observation fits in well with the evidence produced by others as to the distribution of the characteristic lesions of measles throughout the intestinal tract, and draws attention to the fact that the eruption is present on all surfaces of the body.

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Public Health

Bird's-eye View

So far, with the exception of the continued high prevalence of cerebrospinal fever, the epidemiological surprises of the war period have been favourable. Everything seemed to point to a high incidence of endemic infectious diseases from the disturbance of populations by evacuation, but the dispersal of inflammable material and the enforced closure of schools seem to have had more effect in preventing epidemic situations from arising than has the diffusion of carriers in producing them. The severe winter, with the blackout and scarcity of fuel, might have been expected to cause a heavy toll from respiratory infections. Preliminary returns suggested that it had done so, but Dr. Percy Stocks has shown (*Lancet*, 1940, **1**, 725) that if incidence was somewhat higher than usual fatality was less; a result in which the sulphonamide compounds no doubt played their part.

Epidemics of cerebrospinal fever in Europe rarely last into the summer like this one has done, and its course suggests that in the coming winter the incidence may be still higher than in the last. Nothing approaching the present pandemic in extent has occurred in Britain since cerebrospinal fever was differentiated. Fortunately, the fatality-rate has been low, again thanks to the sulphonamides.

In June there was a brisk rise in notifications of enteric fever. In official statistics typhoid and the paratyphoids are not differentiated, but from the very low fatality-rate we may presume that most of the cases are paratyphoid. We know from local sources that whereas outbreaks of paratyphoid B have been fairly numerous and extensive there has been little or no true erbethella. Paratyphoid B is spread mainly by the handling of food, and since foods have been controlled by the Government there has been more handling than formerly. Measles has been highly prevalent, but its fatality very low, and whooping-cough has been low both in prevalence and fatality.

The Government's cheap milk scheme is a social and not a public-health measure, so it is controlled by the Ministry of Food and not by the Ministry of Health. It differs materially from the scheme envisaged in Circular 1840 of the Ministry of Health which was an addition to the Milk (Mothers and Children) Order, distinctly a public-health measure to be administered by the health department. What is to become of the old order is obscure. It is not repealed, so presumably it can still be used by the health department to supplement the Ministry of Food's scheme by granting free milk in quantities above one pint per person per day on medical grounds. The scheme must be welcomed for bringing milk within the reach of the poorer classes of the community, but it shows no regard for public-health requirements.

Points from School Reports

Dr. J. Miller Young's report to the education committee of *Glasgow* is the first in the revised form suggested by the Department of Health for Scotland. The revision was intended to overcome the difficulty of presenting the data obtained by medical inspection so as to give a true picture of the health and physical shortcomings of school-children. The essence of the new system is to divide children into five categories. 1. Free from defects. 2. Otherwise free from defect but suffering from (*a*) defective vision worse than 6/12 in the better eye with or without glasses; (*b*) conditions of the mouth and teeth requiring treatment; or both (*a*) and (*b*). 3. Suffering from ailments (other than those in 2) from which complete recovery is anticipated within a few weeks. 4. Suffering from (or suspected to be suffering from) defects less remediable than defects specified in 1 or 2, distinguishing cases (*a*) where complete cure or restoration of function (in the case of eye defect, full correction) is considered possible; (*b*) where improvement only is considered possible. 5. Suffering from defects in which improvement is not considered possible.

From Dr. Young's report we cannot see that the new system gets over any of the old difficulties, and it certainly adds confusion of its own. It would be an improvement to record as free from defect children with trivial blemishes, but when we are told that of "24,195 children classed as free from defect 15,645 suffered from trivial dental defect (less serious than mouth and teeth unhealthy)" it is hard to find our bearings. Dr. Young says that the new form of report lays greater emphasis on the classification of the individual child according to the remediability of the major defect from which the child suffers, and lays much less emphasis on extensive records of particular, and often unimportant, defects. This may be so, but it is apt to ignore those trivial departures from health which are the first evidences of disease, the remedy of which is the chief object of school medicine. The presence of strabismus is regarded as a temporary condition where no glasses are worn. When glasses are worn the children are classified according to the vision of the better eye. There are some other curious anomalies.

Since the report is in the new style it is not possible to compare the findings of inspection in 1939 with those of former years; but if the new classification survives it will be years before the results will be comparable with any records, for it introduces new standards which are not clearly defined and what is recorded is dependent on the medical officers agreeing with the standards.

Dr. A. Hamilton Wood, school medical officer of *Worcestershire*, mentions that in cleanliness surveys 9·4 % of all children attending school were found unclean in varying degrees, and remarks that if cleansing stations are found necessary for evacuees they may be used for cleansing native delinquents. Doubtless many of the reception authorities which established cleaning stations for received children seized the opportunity to clean up

their natives, but Dr. Wood is the first to state his intention of doing so. This may have far-reaching results in permanently lowering the stubborn 10 % of nitty heads which stands in the way of eradication of the head-louse, for war-time cleansing stations are speedy in their action and waive the formalities of peaceful times.

One of the county dentists, Mr. R. C. Virgo, suggests that when a child accepts treatment under the dental scheme acceptance should hold good for the whole of the child's school life, because many parents accept treatment for infants but refuse continuity of treatment. This gives the service a bad name, for such children will leave school with foul mouths though they may say with truth that they received treatment from the school service. The aim of the service is that all children should leave school dentally fit. Insistence on a clean mouth for insurance and employment will in time help us to secure this. Another dentist, Mr. J. R. Toller, pays a tribute to the school dental services of Birmingham, in remarking on the sound dental condition of the children evacuated from that city.

Reviews of Books

Argyria

The Pharmacology of Silver. By WILLIAM R. HILL, M.D., instructor in dermatology and syphilology in the University of Pennsylvania; and DONALD M. PILSBURY, M.D., associate professor of dermatology and syphilology in the university. London: Baillière, Tindall and Cox. Pp. 172. 14*s*.

A WRITER in the 18th century once remarked that it was not to be expected that a few grains of silver, taken internally, should produce the same exhilarating effect on the human heart as is felt by the man who possesses a satisfactory amount of it but does not swallow a single particle. Nevertheless, silver has continued to be employed in the treatment of various forms of nervous diseases, in gastro-intestinal disorders, and more recently in the form of colloidal or protein preparations as local antiseptics, and as silver arsphenamine in the treatment of syphilis. Cases of argyria or pigmentation of the skin due to silver have been recorded, but most doctors, in our own country at any rate, would describe this condition as a great rarity. It is, therefore, surprising to learn that the number of cases of generalised argyria reported during the last decade has greatly increased, due in the main to the new compounds introduced in therapeutics, nearly a hundred of which are listed in this book. The authors have surveyed and reviewed a large and scattered literature. Though they themselves have not studied the subject experimentally they discuss fully the various views put forward regarding the absorption, transportation and excretion of silver, its deposition in the tissues and the pharmacological effects it produces. They analyse the reported cases of argyria and argyrosis (argyria of the eye), and put forward suggestions for its prevention. The monograph contains a mass of important information difficult if not impossible to get in any other single publication.

Clinical Electrocardiography

By DAVID SCHERF, M.D., associate clinical professor of medicine; and LINN J. BOYD, M.D., F.A.C.P., professor of medicine at the New York medical college, Flower and Fifth Avenue Hospitals. London: William Heinemann (Medical Books). Pp. 352. 25*s*.

THE principal claim of this book to commendation is its emphasis on the German and Viennese contributions to electrocardiography, which have never received sufficient attention in English and American textbooks; it is good to find Wenckebach receiving his due recognition. This has unfortunately been accompanied by the omission of references to some outstanding contributions from this country. Subjects such as parasystole, interference dissociation and the cause of auricular fibrillation are dealt with much more adequately than in the majority of comparable textbooks in English, and the whole subject is covered thoroughly, but the book is marred by a lack of balance which makes it of little value to anyone except an experienced cardiologist. Thus there is a tendency to attribute unjustifiable importance to slight changes in the ventricular complexes as indications of myocardial damage, and the discussion of the significance of ventricular extrasystoles is misleading. Another major criticism is the poor standard of reproduction of the electrocardiograms; in many the time-markings are scarcely visible, and there is no guide to the rate of such markings in individual records. An annoying feature of the book is the presence of authors' names in the text without any reference to them in the bibliography at the end of the corresponding chapter.

This is not a book for the beginner, but the cardiologist will find it stimulating and provocative reading.

Manuel de classification et de détermination des bactéries anaérobies

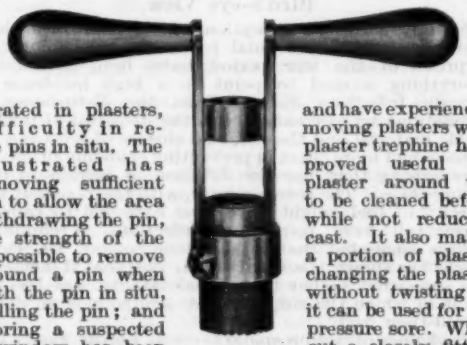
By ANDRÉ R. PRÉVOT, chef de service-adjoint at the Institut Pasteur. Paris: Masson et Cie. Pp. 223. $1.45.

Dr. Prévot is well known in this country for his work on anaerobes and in this small monograph he gives his own classification of the different groups of anaerobic bacteria likely to be encountered in medical bacteriology. Of these, interest attaches principally just now to the anaerobic spore-bearing bacilli, which Prévot logically separates into the true clostridia (with central or subterminal spores) and the plectridia or terminal sporing bacilli—thus *Clostridium welchii* but *Plectridium tetani*. He recognises the different types of *Cl. welchii* according to their toxin production but makes no reference to the serological varieties of the tetanus bacillus or to atoxic strains. The little known group of anaerobic streptococci is divided into two main tribes—gas-forming and fœtid or non-gas-forming and non-fœtid—with four species in each. The gram-negative non-sporing pleomorphic bacilli which include *Bacterium necrophorum* and *Bacillus funduliformis* are placed in the class of actinomycetales under the family name of spherophorus, but no attempt is made to show the relationship of one to the other or of this group to the fusiform bacilli. *Bact. melaninogenicum*, which has close affinities with this group, is placed among the true bacteria. In the family of actinomycetes Prévot includes not only the streptothrices proper but also the anaerobic intestinal lactobacilli and anaerobic diphtheroids, an arrangement which would not appeal to English bacteriologists. All of us, however, might read his brief introduction with profit.

New Inventions

PLASTER TREPHINE

I HAVE often seen low-grade infection developing after the removal of skeletal traction pins or wires incorporated in plasters, and have experienced difficulty in removing plasters with the pins in situ. The plaster trephine here illustrated has proved useful for removing sufficient plaster around the pin to allow the area to be cleaned before withdrawing the pin, while not reducing the strength of the cast. It also makes it possible to remove a portion of plaster around a pin when changing the plaster with the pin in situ, without twisting or pulling the pin; and it can be used for exploring a suspected pressure sore. When a window has been cut a closely fitting dressing can be applied which will prevent œdematous swelling through the opening. The instrument is similar to an ordinary trephine without the side teeth, with a cutting edge 1¼ in. in diameter. The blade is removable for cleaning and replacement.



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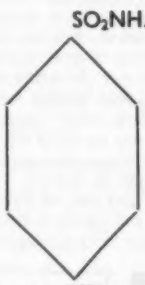

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LONDON: SATURDAY, AUGUST 3, 1940

TREATMENT OF FRACTURES

BEFORE the war the Interdepartmental Committee on the rehabilitation of persons injured by accidents estimated that the total number of fractures treated yearly in voluntary and municipal hospitals was about 200,000, and that only about 50,000 of these were treated in hospitals with an organised fracture service of any kind. It is idle, at present, to try to assess the number and distribution of fractures likely to occur in the coming months or years, but clearly in this war, unlike the last, generous accommodation will have to be provided for civilians as well as soldiers. Those responsible for the emergency hospital scheme of the Ministry of Health have kept this in mind in planning the fracture service of the country and have aimed at wide distribution of centres. The suggestion made originally by the interdepartmental committee, and recently supported in a memorandum from the British Hospitals Association to the Minister of Health, that a national fracture service should be established in the voluntary hospitals is not really feasible; the voluntary hospitals are too centrally placed to provide for the wide regions they would have to serve. Mr. H. A. T. FAIRBANK, adviser to the Ministry, assisted by the five area orthopædic consultants of the E.M.S., has begun to organise a scheme in which the orthopædic hospital is the basic unit. There are 19 such hospitals in England and Wales, well distributed and by now well equipped. In addition to the necessary instruments and tackle for operative, bed and ambulatory treatment of fractures, each of these hospitals has a modern physical-medicine department large enough to serve the number of patients for whom casualty beds are available. The organisation of physical medicine has been in the hands of Sir ROBERT STANTON WOODS, consultant adviser in this specialty. Treatment is provided under three heads: massage and electrical treatment; rehabilitation by class exercises and gymnasium training; and occupational therapy. True vocational training—in the sense of training an injured man to a new trade—is not being undertaken under the Ministry of Health; the responsibility for this side of rehabilitation appears to lie with the Ministry of Pensions as it did in the last war. The divorce of vocational training from physical treatment, it may be recalled,[1] was regretted by Dr. R. FORTESCUE FOX whose experience on the War Disablement Committee of 1914–18 led him to believe that the two were inseparable components of rehabilitation. Many patients regain full use of a disabled part in the natural course of healing, and to provide vocational training for these would be extravagant; but for those in whom the residual disability is great occupational therapy cannot replace the stimulus of learning a new trade or re-learning an old one.

In addition to the 19 orthopædic hospitals, provision for the treatment of fractures has been made at 526 other hospitals. These are being newly equipped with materials for treating fractures or are having their equipment supplemented. At the advanced base and base hospitals the proposed complement of equipment includes Steinmann pins and Kirschner wire, stirrups for skeletal traction, Balkan beams, fracture beds, Böhler's traction apparatus and portable and fixed X-ray apparatus; there will be a physical-medicine department in every I.A. hospital of over 300 beds. A further scheme for building new hutted hospitals in useful places is developing quickly. Plans are being made to provide these with physical-medicine departments similar to those of the orthopædic hospitals though on a more economical scale; it is doubtful, for example, whether it will be possible to equip them for occupational therapy. Finally the casualty receiving hospitals have been supplied with large quantities of splints and plaster, and the aid-posts with extra splints. Staffing of departments of physical medicine has presented some difficulties. In London it has been possible to appoint a specialist in physical medicine to supervise the work in each sector. Outside the London sectors, however, it has so far only been possible to provide a specialist on a sessional basis in each region. Auxiliary personnel has been made available through the Chartered Society of Massage and Medical Gymnastics and can be tapped at any time. Some six or seven thousand members have agreed to serve in a massage corps; their names are registered with the society under a system of cross-references designed to provide staff, wherever required, at short notice.

The accommodation available, even under the fully developed scheme, would not be sufficient to enable every fracture case to be carried through to complete rehabilitation if casualties occurred on a large scale. Wards and physical medicine departments would quickly become congested. To relieve such congestion the Ministry has secondary hospitals in mind, to which convalescent patients could be shifted for continued treatment. These would have to be within ten miles of the orthopædic hospitals and working in liaison with them. The Red Cross also has a scheme for providing convalescent hospitals—for service casualties only—to be set up in big country houses. It seems important that patients received in them should not be cut off from physical treatment and occupational therapy. If rehabilitating exercises, preferably in the form of games, and the visit of an occupational therapist occupied half the day, the patients would still have ample time for the idling which forms a part of convalescence and would be spared some of its boredom.

In this fracture service, as devised, the spas have no place. So far, one of them has been chosen to receive those officers and men with rheumatic disorders who are unlikely to be cured within three weeks in a general hospital; if accommodation at this spa becomes overcrowded, the other spas will probably be called upon. Hydrotherapy, however, has a value in many conditions besides rheumatism—in minor injuries and stiffness following wounds, as well as in the treatment of fractures. Only one of the orthopædic hospitals has its own hydrotherapy department so far, though some of the converted mental hospitals have bath equipment which might be reconstituted and used for the purpose.

1. *Lancet*, 1940, **1**, 1175.

INDUCTION OF LABOUR

THE old way of inducing labour by rupturing the fœtal membranes has lately been returning to favour, and many obstetricians now prefer this simple procedure to the use of Krause's bougie, the stomach tube, or the hydrostatic bag. By rupture of the membranes either of two distinct procedures may be meant. In one the bag of forewaters is torn open at its lowest and most accessible point; in the other a specially designed metal catheter—such as that of Drew-Smythe—is passed through the cervical canal high into the uterus, and made to puncture the amniotic sac above the level of the presenting part of the fœtus. It is this second method that is becoming increasingly popular. It is simple, anæsthesia is not usually necessary, there is no danger of dislodging the presenting part or producing prolapse of the cord, the risk of sepsis is slight, and its efficiency is fairly high. MAIZELS,[1] who has analysed 842 inductions of labour, believes that this is the method of choice in all cases except where there is antepartum hæmorrhage, whether the head is floating or engaged. He maintains that it leads to less maternal morbidity and sepsis than any other method of surgical induction and it does not lengthen labour. The delay before pains begin varies, but according to MAIZELS over 86% of all patients are in labour within four days. Exceptionally a second puncture of the membranes may be necessary. The quantity of liquor removed bears no relation to the length of the latent period, but the period can be shortened by medical induction before or after puncture. From a discussion opened by J. S. QUIN at the Royal Academy of Medicine in Ireland, it was clear that the consensus of opinion was strongly in favour of the operation, even when it was used for that much debated indication—the treatment of incipient fœto-pelvic disproportion in the primigravid woman. But some doubt was expressed as to whether a patient with a long undilated cervix was a suitable subject. In such cases labour induced prematurely by this or any other method is apt to be abnormally protracted, and cæsarean section may eventually become necessary at a time when the patient has, bacteriologically speaking, become a bad risk. Further experience with œstrogenic medication and other lines of hormone therapy may show how such an "unreceptive" uterus may be made to modify its behaviour and expand its lower segment, thus preparing the way for true labour.

These discussions bring to the front another hardy perennial of the obstetric world. How useful, how safe, and how sure is a purely medical induction of labour? Early workers on this subject, such as WATSON,[2] claimed a 70–80% success for the combined action of castor oil, quinine, enema and hot bath, followed by cautious injections of pituitary extract if labour had not begun after 8–10 hours. Later workers have not been so successful, and it is now generally agreed that the method should be restricted to mature or post-mature women. If gestation has not gone to term, or at least to within a few days of that date, such treatment is merely wasteful of time and material, and imposes a needless trial on the fortitude of the patient. Controversy has centred round the use of quinine. Some workers believe and some deny that this drug has an ecbolic action in the human subject. The weight of clinical evidence, however, is in favour of assigning to the drug an irritative action which renders the uterus more responsive to other stimuli. Unfortunately when quinine is used for induction of labour the dose employed is usually very high. Ten grains of the drug in solution are administered three or four times at two-hourly intervals, and since quinine is not quickly excreted it has a cumulative action and toxic effects, especially auditory disturbances, are common. Much more serious is the effect on the fœtus. Cases have been recorded in which the fœtal heart has unaccountably stopped several hours after the administration of quinine. These cases may be rare, but they are of tragic importance, and it is fairly certain that in a small proportion of cases the fœtus in utero is unusually susceptible to the drug. With the increasing appreciation of this risk many obstetricians now reduce the total dose of quinine from thirty grains to half, or less than half, that amount. With this reduced dosage the risk of fœtal death appears to be very remote, though the efficiency of the drug in promoting labour is also somewhat diminished.

Search for improved methods continues. Unsatisfied with the results of the castor oil-quinine technique. EHRENBERG, ROBBINS and HAUGEN[3] have replaced the orthodox quinine with the ergota preparata of the U.S.P. (crude ergot powder with its fat removed). Their method is to give 2 oz. of castor oil followed half an hour later by gr. 12 of the ergot by mouth. The powder is repeated in two or three hours and occasionally a third dose is given. Of 142 medical inductions for various indications they were successful in 78%. This method seems merely to replace a possibly dangerous drug by another of much more certain danger. Ergot has long since ceased to be used until delivery is complete. The rapid succession of uterine contractions it evokes may asphyxiate the infant, or may even rupture the uterus by their violence. Not without reason was the early "pulvis ad partum" cynically renamed the "pulvis ad mortem." The dosage now proposed is, however, small, though it is difficult to be sure how small, for not only are the methods of assaying ergot principles notoriously difficult but consideration must be given to the relative concentration of some half-dozen different alkaloids. Moreover, samples of crude ergot vary at least fourfold in their total alkaloid content. It may also be mentioned that when ergometrine, the quickly acting orally active ergot alkaloid, was isolated some years ago several investigators in this and other countries began to test its possible action in inducing labour. It is significant that no satisfactory report of its safe use for this purpose has yet been published. The present method, using an inexact dosage of a mixture of alkaloids, seems even less likely to be safe or effective; the efficiency claimed for it is not strikingly high, and is, indeed, decidedly less than can be obtained by combining puncture of the membranes with drug induction, using only a moderate dosage of quinine.

1. Maizels, G. *J. Obstet. Gynec.* 1940, **47**, 237.
2. Watson, B. P. *Amer. J. Obstet. Gynec.* 1920, **1**, 70.
3. Ehrenberg, C. J., Robbins, O. F. and Haugen, J. A. *Ibid*, April, 1940, p. 653.

THE HYPOTHALAMUS

GREAT headway has been made in discriminating between the functions of the hypothalamus and the pituitary body, but much remains in doubt. The essential part played by the anterior lobe of the pituitary in the regulation of growth and metabolism may be taken as established, but the activities of the posterior lobe are more of a mystery. Thanks to the work of S. W. RANSON and his school we have learnt a good deal about the neurogenic control of this lobe and of the experimental production of diabetes insipidus by division of the supraoptico-hypophyseal tract, but we do not yet know where the anti-diuretic hormone is produced. The cytological appearances of the posterior lobe in general do not suggest secretory activity but GERSH'S [1] description of specific parenchymatous cells with characteristic cytoplasmic inclusions in this lobe in a great variety of animals, and his observation of nerve terminations in baskets about these cells support the theory of a secretory function. On the other hand, the integrity of the major part of the anterior lobe is essential for the maintenance of maximal diabetes insipidus. In man, the rat and the cat complete removal or destruction of the anterior lobe prevents the development of polyuria when the posterior lobe has been injured or removed; but replacement therapy by injections of anterior-lobe extract has not increased water output in the hypophysectomised rat, although it has in the cat and dog. It has also been found that total thyroidectomy in dogs will abolish a pre-existing diabetes and will reduce the polyuria in diabetic cats. These and other puzzling facts are interpreted by GERSH [2] as indicating that the anterior lobe and the thyroid gland have no specific influence on water metabolism but that they play a part in the maintenance of normal function.

Apart from the control of diuresis the hypothalamus may dominate the disposition of water within the body. Thus BARBOUR [3] adduces evidence that in a cold environment cats and monkeys will show a shift of water from the blood to the tissues, especially the liver; on raising the temperature the mechanism is reversed. The centre concerned appears to lie in the anterior part of the hypothalamus. BARBOUR also confirms RANSON'S [4] findings that these animals have two centres in the hypothalamus for the control of heat regulation. According to RANSON the region between the optic chiasm and the anterior commissure is concerned in preventing overheating of the body. Local heating of this area calls into operation the various mechanisms for dissipating heat, and if it is damaged hyperthermia results. The centre for heat preservation is more caudal, and lesions in this part of the hypothalamus cause hypothermia, as a result of the destruction of descending paths. The mechanism protecting against chilling is not, however, seriously impaired unless the lesion is bilateral and caudally placed. RANSON'S experiments were made chiefly on cats, and the ways of eliminating heat in man are different from those in the carnivora. Nevertheless there is experimental evidence that the centres for control of heat regulation in the monkey are similarly placed to those of the cat and hence their position is probably constant in the primates. ZIMMERMANN [5] reports a case in which a small lipoma caused destruction of the right mammillary body and was associated during life with a persistent, otherwise unexplained, hyperthermia.

As the centre for sympathetic control the hypothalamus has additional functions, such as cardiovascular regulation, control of gastro-intestinal tone and movement and pilomotor activity. Its importance in connexion with sleep has long been recognised but the question of a "sleep centre" is still highly controversial. Finally, the hypothalamic control of fat metabolism, in some of its aspects at least, must be accepted since the syndrome named after Fröhlich has been experimentally reproduced by damaging the tuberal region.

1. Gersh, I. *Amer. J. Anat.* 1939, **64**, 407.
2. Contributing to The Hypothalamus and Central Levels of Autonomic Function. Proceedings of the Association for Research in Mental Diseases for Dec. 20 and 21, 1939. Baltimore: Williams and Wilkins Company. Pp. 980. $10.
3. Barbour, H. G. *Ibid.*
4. Ranson, S. W. *Ibid.*
5. Zimmermann, H. *Ibid.*

GUILLOTINE AMPUTATIONS

THE guillotine amputation, a rapid removal of the limb by a circular sweep of the knife and a cut of the saw, appeared in the British and French armies during the early phases of the last war, when the prevalence of gas gangrene seemed to justify any measure that might check its ravages. It was speedy, it provided excellent drainage, and, compared to the classical amputations that preceded it, it saved life. Its disadvantages were soon apparent: in the immediate postoperative phase, shock due to pain and excessive loss of body fluids; in the stage of repair, secondary hæmorrhage, which was commoner than with any other type of wound; later still, retraction of soft parts, leaving a long cone of granulations with the skin round its base and one or two inches of necrosed bone at its apex; finally, a stump too short for use, obtained after several secondary operations.

MURRAY, writing in 1918 of cases received from France at a base hospital in England, said "A guillotine amputation invariably necessitates re-amputation, but apart from this the great disadvantage is that by the time the patient has arrived in England the skin has retracted so much that a large granulating and suppurating stump is exposed. The dressings are often extremely painful, and the subsequent loss of bone, even after prolonged extension to draw the skin down, is sometimes very great . . . a few weeks after the operation, owing to skin retraction, the appearance of the stump would almost suggest that the patient had been amputated from the limb and not the limb from the patient." GIBBON, speaking in 1919 to the American Surgical Association on his experience of the guillotine amputation with the B.E.F. and the A.E.F., refers to "the frequent secondary hæmorrhage, the slow healing extended over months, the painful dressings and the secondary operations which are necessary in all of them," and asks his hearers to set their faces against it.

These observations are typical of an experience that was wellnigh universal, and that led to the banishment of the operation from British hospitals. It is therefore a matter for regret that the lesson

must be re-learned, that in our base hospitals today are wounded men suffering from the results of this discredited procedure, and that the surgeons who performed it can point to contemporary writings recommending or at any rate condoning the guillotine amputation. The advice probably intended by these recommendations, that amputations in war should be done rapidly and left widely open, and that every effort should be made to avoid skin retraction afterwards, is excellent, but the implications of the word "guillotine" are so sinister and the operation to which it properly belongs is so horrible, that responsible writers would do well to avoid the term altogether. Skin is viable and easily turned back, and the time spent in dissecting two flaps or a cuff is negligible compared to that necessary for hæmostasis. Drainage in a flap amputation left open is in no sense inferior to that in a flush one. The disadvantages of the guillotine are so immense and so irreparable, and its advantages compared to a flap or cuff operation rapidly performed and left unsutured so illusory, that it should, once and for all, be abandoned.

Annotations

THE TRUBY KING TRADITION

MUCH has been learnt of the science and art of infant feeding in the seventeen years since the Mothercraft Manual first appeared, and although the tenth edition (Churchill. 3*s*. 6*d*.) is described as revised and brought up to date it is fair to wonder whether the accumulated experience of workers outside the Mothercraft Training Society, of which Miss Mabel Liddiard, the author, is nursing director, has been given the weight it deserves. Sir Truby King, whose teaching Miss Liddiard confessedly expounds, owes his lasting fame to his work for nursing mothers and their infants, to his warm and successful advocacy of natural feeding, his study of the technique of giving the breast, and his demonstration of the causes and cure of failing lactation and of the value of residential clinics for mothers and babies. All this stands and will stand. The principles he taught and employed in artificial feeding were, perhaps, less securely based and have not found general acceptance. They did not pass without comment at the time when Truby King brought them with him from New Zealand. Replying then to a charge of standardising the human infant,[1] he disclaimed dogmatism and defined his aim as an attempt to approximate the composition of the baby's food to the standard set by nature. "I am not suggesting," he said, "that the recipes . . . afford the best and closest approximation feasible, but they . . . have proved satisfactory in practice, without alteration, over a long period of time."

Many responsible for feeding infants have abandoned percentage feeding because they have found that babies can and do digest richer and simpler mixtures without difficulty or ascertainable harm either at the time or later, and because, unless the baby's appetite for fluid is large, it is often difficult by the percentage method to give him enough food to grow on. It is therefore disappointing to find that although Miss Liddiard warmly advocates breast-feeding she gives considerably less space to it than to what she calls unnatural feeding, and that her statement that there is no such thing as humanised milk is followed by 11 separate tables for making "modified or humanised milk" all based on the percentage method which is carried to the point of half ounces of milk and quarter ounces of water in 25 ounces of mixture. Surely such instruction is not good for the young mother's sense of proportion any more than it is for the medical student's, who, as Professor Vining has complained in our correspondence columns (July 6, p. 22), is taught to approach infant care as he would a difficult mathematical problem.

Throughout the book a certain distrust of nature and her infinite variety is apparent. A breast-fed baby who puts on over 8 ounces a week is gaining "too much"; one whose bowels do not act for 48 hours demands "local measures" to inducee an action; no baby, unless premature, can require a night feed; milk puddings must still be sieved at 11 months and no meat is allowed before 18 months because it is "acid forming" and "too stimulating for nervous children." There is scarcely a hint that one "normal" baby may grow much faster or need much more food for his age or weight than another "normal" but quite different baby. Overfeeding is blamed for many ills and is said to be very common among breast-fed babies a few weeks old; underfeeding is dismissed in half a page almost as if it were a rarity. All this is the greater pity because in other respects there is much to praise in the book. It is full of practical instruction and wastes few words in sentiment. There is good advice, well illustrated by simple drawings, on clothes for the expectant mother and the baby, nursery furniture, feeding bottles and prams, and the detailed directions for carrying out what is recommended are always clear and simple.

This is in a sense an important book, firmly relied on by many mothers who follow its advice to the letter, with the faith that so many have in the printed word. Is it too much to hope that the next edition may be not only revised but reeast, giving more space to the technique of nursing, fewer and simpler milk mixtures and at least a hint that what may be enough for Baby A, who has the trick of storing some grammes of his ration, means starvation for poor little B, who turns all his into calories?

A VIRUS BY ANY OTHER NAME

MOST young sciences at first use the technical terms of those disciplines from which they are derived. As they grow up they develop a language of their own and in some cases modify the meaning of words derived from their parents. The study of viruses is directly "apparented"—to use a word coined by Toynbee in his "Studies in History"—to bacteriology, and many of its technical terms are therefore borrowed from bacteriology. On these grounds Sergent, Parrot and Horrenberger[1] object to the word "virus." They point out that a large number of terms have been used to designate viruses; some depend on the question of visibility, such as "ultra or ultramicroscopic virus," others are associated with filterability, "filterable or filtrable virus, filter-passers," while terms such as strongyloplasmas or borrelina have been specially coined. None of these terms are satisfactory, but objections to the word virus tout court rest on less firm foundations. The Latin word virus, meaning poison, was first used in French in the sixteenth century by Ambroise Paré, and the O.E.D. gives 1599 for its first use in English in this sense. In 1800, Jenner wrote "The pustules contain a perfect smallpox virus"; and in 1867 Pasteur employed the word to describe transmissible pathogenic factors, including such agents as the virus of fowl cholera, of anthrax, and of rabies. In French, though not to the same extent in other languages, virus has continued to be used both in a broad and in a narrow sense. In view of this, it is suggested by Sergent and his colleagues that the term virus (*sensu stricto*) should be dropped since it is not right to restrict the meaning of a word consecrated *in lato sensu de jure et de facto*. In place of virus it is proposed to employ the word "contagium" used originally by Beijerinck in

[1] *Lancet*, 1918, **1**, 542, 655.

1. Sergent, E., Parrot, L. and Horrenberger, R. *Bull. Inst. Pasteur*, 1940, **38**, 385.

1899 in reference to the agent of tobacco mosaic; the adjective derived from contagium would be "contagious."

The following definition is therefore proposed. Every agent of a transmissible disease is called a virus (*sensu lato*); there are two sorts of virus, (1) viruses that can be seen with the microscope, and these are called microbes (Sédillot 1878), (2) viruses that cannot be seen with the microscope (less than 100 mμ), called, according to the rules of priority, contagia (*sensu stricto*) (Beijerinck 1899). It does not seem likely that this definition will commend itself either to bacteriologists or to those interested in virus infections. If strict priority is to be insisted on, the application of the word virus by Jenner to smallpox long antedates its use by Pasteur for bacteria and rabies virus. The definition suggested by Sergent and his colleagues also draws an unjustifiable distinction between those viruses that are greater and those that are smaller than 100 mμ, while finally there would be endless confusion if the word contagium, and certainly its adjective contagious, were restricted to what, in English at any rate, will almost certainly continue to be designated viruses.

ACCIDENTAL GASSING

THE use of irritating gases as a weapon in the last war led to a study of the action of chlorine and phosgene on the respiratory tract. Since that time the large-scale use of these substances in the chemical industry has provided opportunities of studying accidental gassing under conditions more adapted for scientific observation than those of the battlefield. In a recent publication Thelwall Jones [1] describes the treatment of 259 cases, mostly of chlorine poisoning. As an immediate measure he recommends the inhalation of a spray of 10% sodium thiosulphate in the mild cases of chlorine poisoning where irritation of the upper respiratory tract is the prominent symptom. Warmth and rest are of primary importance. Cases of phosgene poisoning should never be allowed to walk and even slight cases should rest in bed for at least 24 hours, since pulmonary œdema may appear with great suddenness several hours after gassing. Moderately severe cases of chlorine poisoning with difficult respiration, cyanosis and swollen neck veins will benefit by venesection, up to 20 oz., but phosgene cases should not be bled unless there is definite evidence of embarrassment of the right heart. In the early stages, inhalation of 7% carbon dioxide (dicarbox mixture) may help by causing deep breathing and opening up the alveoli. Later on, oxygen alone is to be preferred, especially if the dicarbox causes distress; and in severe cases of phosgene poisoning with lung œdema oxygen must be given continuously for many hours. Any tendency to heart failure is counteracted in chlorine cases by pituitary extract (1 c.cm.) or Coramine (1 or 2 c.cm.) and brandy; in phosgene cases by coramine or camphor in oil, or if the pulse is rapid and feeble by full digitalisation with digoxin—0·5 mg. intravenously followed by one tablet of 0·25 mg. by mouth every 6 hours. Morphine should not be given and the value of atropine is doubtful.

RADIOGRAPHY OF THE BRAIN

FOR some years pneumo-encephalography has been accepted as the standard method for the radiological investigation of diseases of the brain. That it has not attained the position of such examinations as the barium meal or excretion pyelogram is chiefly owing to the unpleasant symptoms experienced by the patient. The actual dangers of the procedure are agreed to be negligible whether the cisternal or the lumbar approach is used. In England and the United States the lumbar approach is usual, but the Swedes favour the cisternal approach. This method seems anatomically more sound, in that the air or oxygen is injected directly into the cisterna magna and so ensures, theoretically at least, a greater chance of filling the ventricles rather than the subarachnoid space. Sjöquist's [2] method is simple and satisfactory. At the Royal Serafimer Hospital, Stockholm, where it is exclusively employed, about 2000 examinations a year are performed, and in about 90% of cases the ventricles are adequately filled. Recently Hepburn [2] of Edmonton, Canada, has described a double puncture method, by which he maintains a constant cerebrospinal-fluid pressure in the lumbar region during the injection of oxygen. He uses oxygen in preference to air because it is more soluble and so more quickly absorbed; he also gives a premedication of morphia and hyoscine. By this method he claims that the incidence and severity of symptoms are reduced. Unfortunately, as Von Storch [3] has shown, by keeping the lumbar cerebrospinal-fluid pressure constant one does not keep the pressure of the various regions of the subarachnoid space at their normal pressure levels. In the normal individual the cisternal pressure is around zero when in the erect position; after gas injection there is a tendency for the whole system to approach an equal pressure throughout. The presence of the gas also introduces new factors, some known and some unknown. We know that the gas expands on being raised from room to body temperature; we know that the meninges are irritated and that certain vasomotor changes occur which alter the volume, and consequently the pressure, within the subarachnoid space. How are we to reduce these effects? A double puncture method or a two-way needle, both of which allow the admission and expulsion of equal quantities of gas and C.S.F., reduces pressure changes to a minimum during injection. At present it seems that the technique which provides the most adequate ventricular filling, and at the same time reduces the symptoms as far as possible, is to use warm oxygen, a double-bored needle, the suboccipital approach, and a basal narcotic. Unfortunately gas produces certain physical and physiological effects on the cranio-vertebral system which are beyond our control; and until the pharmacologists discover a suitable non-toxic contrast material which is either excreted by the choroid plexus or may be injected directly into the subarachnoid space encephalography will continue to be somewhat unpleasant for the patient.

PHOSPHATE INTAKE AND THE PARATHYROIDS

IT has long been known that if the parathyroid glands are removed typical tetany results, and that this is associated with a low serum-calcium and a high serum-phosphorus; with this change it is possible that the acid-base balance is altered, as of course it is in the tetany of alkalosis. Hitherto it has been generally assumed that the low blood-calcium rather than the high blood-phosphorus is responsible for the actual symptoms of tetany, but there are some points which suggest that it may in fact be the blood-phosphorus factor which is really at work. Whether this is the case or not, it seems possible that the parathyroids act primarily on the phosphorus rather than on the calcium metabolism, and that changes in calcification, for instance, may sometimes be merely the secondary result of variations in phosphate equilibrium. Following up this possibility, A. J. Helfet [4] has studied the bone changes in certain parathyroid diseases. He first formulated an ingenious theory of parathyroid function and has then checked his ideas by clinical observations. He suggests that parathyroid secretion—parathormone—controls the level of inorganic phosphate in the blood, and that its function is to prevent this level rising rather in the way that insulin prevents the blood-sugar rising. Conversely he assumes that a rise of phosphate in the blood, if it does occur, may act as a stimulus to parathormone secretion,

1. *J. industr. Hyg.* 1940, **22**, 235.

1. Sjöquist, O. *Nord. med. Tidsk.* 1937, **13**, 711.
2. Hepburn, H. H. *Canad. med. Ass. J.* July, 1940, p. 28.
3. Von Storch, T. H. C. *Brain*, 1936, **59**, 250.
4. *Brit. J. Surg.* 1940, **27**, 651.

again comparable to the effect of an increased sugar intake in increasing insulin output and glucose tolerance. Finally he suggests that parathormone prevents the blood-phosphate rising both by stimulating the excretion of phosphate by the kidney and by mobilising fresh calcium ions from the bones so as to form inactive calcium phosphate which can be readily excreted.

Helfet has applied these views to various cases of definite hyperparathyroidism. Of these the classical generalised fibrocystic disease is the best example, in which there is a true adenoma of the parathyroid, the blood-calcium is high and the blood-phosphorus reduced. On surgical removal of the adenoma the condition reverts to normal and no other treatment is as a rule required. Less dramatic cases are those of fibrocystic disease of unknown origin, in which no parathyroid tumour is found and blood-phosphorus and blood-calcium levels are normal. The clinical picture, however, resembles almost exactly that of generalised fibrocystic disease, showing similar osteoporosis and cyst-formation in bones. These cases, though rare, have been described by Hunter and others and Helfet has been able to examine and treat four of them. His treatment is based on his view that in these cases phosphates are retained in the body, with resultant stimulation of the parathyroids and excessive parathormone activity. In order to reduce phosphate absorption Helfet gives the patient aluminium acetate, which combines with phosphate in the intestine and precipitates insoluble aluminium phosphate. He has observed no ill effects from giving aluminium acetate continuously for over a year. The amount given daily (ℳ 75 of the B.P. liquor) has a phosphate-combining power equivalent to about gr. 3 of calcium. No calcium is given other than that contained in a normal diet, which includes not less than one pint of milk a day; no other treatment or preparations are ordered. All Helfet's four patients improved during the course of treatment, which had naturally to be maintained over many months; the radiological appearances of the bones at the end of six months' treatment are very striking. While recognising the empirical nature of his treatment in other conditions Helfet has cautiously suggested that it may have other applications, and he reports some results in twelve cases of rheumatoid arthritis. There he is on less certain ground, but further work on phosphate intake and the parathyroids may well throw light on several metabolic disorders at present little understood. He has opened up a promising approach to this obscure subject.

GEORGE'S FOUNDATIONS

THE general practitioner, who seems to be fair game when anybody has an edifying maxim to deliver, is often told he has an unrivalled opportunity for psychotherapy. No doubt he has, and probably many a mental and nervous illness is avoided because the family doctor is willing to stand by during mental catharsis. On the other hand, psychotherapy in established neurosis and psychosis is a tricky business even in the hands of experts; and the experts themselves admit their knowledge to be embryonic as yet. The general practitioner is not going to learn much from hasty outlines of technique or woolly generalisations drawn from one or two special cases. In some ways Dr. Anita Mühl[1] falls into this error of making it all sound too simple. She points out, with justice, that it is the business of the doctor to let the patient talk, and that this applies just as much to the consultant in any specialty as to the general practitioner and the psychiatrist; but her analysis of ordinary types of people into the shut-in, the grouch or cynic, and the moody or oscillating is too superficial to be helpful. She admits, as we all agree, that the foundations for satisfactory adaptation must be laid in childhood, and suggests that these foundations should include the ability to respond constructively to intelligent discipline without being dominated, to develop self-control without being repressed, to face reality without dimming creative imagination, and to accept responsibility for one's own mistakes without developing a sense of inferiority or a feeling of guilt. At that rate the foundations include the finished edifice; it is like saying: "Thanks to a well-integrated personality George will be able to develop a well-integrated personality." It gives no clue to the process. Yet even as the finished product, a George raised on these lines would perhaps leave something to be desired. Is it really the ability to respond constructively to intelligent discipline which will stand him in good stead? What about unintelligent discipline? He will get far more of that, both from people and things. Intelligent discipline might fit him for a wholly just world, and undoubtedly he should receive such discipline from the elders he trusts, or he will have no faith in justice as a principle. But it is the injustice he meets which will ultimately educate him, and turn him into the mature citizen who can take the rough with the smooth. Education is a lifelong process, and Dr. Mühl is probably right in not explaining how her foundation-stones are to be laid. Certainly the doctor, an occasional visitor and looker-on, can do little to influence the building up of George beyond scraping off an exuberant bit of mortar, or offering a word of advice about alignment.

1. *Med. J. Aust.* 1940, **1**, 651.

HERB PROSPECTS

HAVING regard to the cessation of imports of vegetable drugs from Europe this season's English crops of medicinal plants will attract more than usual interest. Several firms have now issued their reports. Stafford Allen and Son, Ltd., describing the outlook on their farms at Long Melford, say that there has been a good crop of second-year biennial henbane plants; leaf and flower of good alkaloidal content have been harvested. There are prospects of a good crop of high-testing digitalis leaf, but on this West Suffolk farm last winter's severe frost destroyed most of the main belladonna plantation so that little leaf has been dried in consequence; young belladonna plants are, however, looking up and should produce sufficient for a good average next year. The crop of valerian is fine, and aconite looks promising. Potter and Clarke Ltd. say that the hard winter frosts made it impossible to dig dandelion for several weeks and the balance of stock in hand is now "perilously low"; collection of the autumn roots will be started in the earlier part of August, but until then orders must be rationed. Reports from both these firms are unfavourable in respect of chamomile; the crop is poor and the high cost of picking and drying coupled with a small demand has given little inducement to grow the flowers in previous years. Now that fresh supplies of Belgian chamomile are unobtainable an impetus will be given to English growers to increase the acreage under this crop; the present price of the small remnants of the stock of Belgian flowers is soaring. The bright spot in English herb cultivation is lavender; in some districts the bushes stood up to the severe winter and not only is it flowering earlier this year but the harvest is better than usual. Lavender water goes with convalescence, and it is well to know that with French lavender oil no longer available there will be no famine in English oil, which for its fragrance is esteemed throughout the world. The flowers which used to be sent to the market in bunches will now be left to ripen for the still.

Dr. H. B. W. MORGAN has been returned to Parliament for the borough of Rochdale. He sat in the House of Commons from 1929 to 1931 as Labour member for N.W. Camberwell. In 1932 he succeeded the late Sir Thomas Legge as consultant specialist on industrial diseases to the Trades Union Congress general council.

Special Articles

M.R.C. MEMORANDUM ON BREAD

THE Accessory Food Factors Committee of the Lister Institute and Medical Research Council has examined the ways in which the health of the people of Great Britain might be benefited by improving the nutritive value of the wheaten bread which they eat, and makes four recommendations.

Recommendation 1.—Flour for the bread of the people should contain the germ of the wheat grain, as much as possible of the aleurone layer, and the finer portions of the bran. Instead of flour consisting of about 70 % of the wheat grain, as it does at present, the percentage extracted should be at least 80 to 85 %.

By this means the content of certain vitamins, of all minerals, and of fat, would be increased, and the nutritive value of the protein would be improved. The degree to which such an increase would benefit individuals would naturally depend on the extent to which they were consumers of bread. The largest amounts of bread are eaten by those whose small incomes limit their power to purchase the protective foods. Any improvement in the nutritive value of bread would, therefore, affect in the highest degree those most in need of it. If 1 lb. of bread a day is taken as the average amount consumed by an adult manual labourer, a rough basis is provided for calculating the benefit which small-income dietaries would derive by a change from a flour of 70 % to one of 80 % extraction.

VITAMINS

Vitamin-B complex.—The minimum daily requirement of vitamin B_1 for the ordinary adult is 300–500 international units, and is almost directly proportional to the intake of carbohydrate. Carbohydrate constitutes at least two-thirds of the nutrients in bread, and the intake is, therefore, very large in those who eat much bread. The 1 lb. loaf made from white flour of about 70 % extraction gives about 80–160 I.U. vitamin B_1, while that made from flour of 80–85 % extraction would give 300–450 I.U., an amount almost satisfying the total requirement. The committee is of the opinion that the change in this one dietary essential alone would benefit greatly the health of adults and children of all classes in Great Britain. The content of other members of the vitamin-B complex such as riboflavin would also be greater in the browner flour, but the knowledge on this subject is less exact than for vitamin B_1.

Fat and fat-soluble vitamins.—A change from 70 % to 80–85 % extraction flour would, by including the germ, substantially increase the quantity of vitamin E and of fat of high linoleic-acid content. Knowledge is at present insufficient to show whether these contributions would be an important advantage to the population of the British Isles, but the presumption that they would be is strong. Clinical evidence exists pointing to the value of vitamin E in human diets.

Carotene (*Provitamin A*).—The carotene content of the flour would not be greatly enhanced because this provitamin is distributed throughout the grain, and is present in small amounts in 70 % flour if not previously destroyed by bleaching. If the flour has been bleached the whole of the carotene may have been destroyed together with certain of the other nutritive elements, riboflavin, vitamin E and linoleic acid.

Recommendation 2.—The bleaching or improving of flour by the use of oxidising agents, such as nitrogen chloride, nitrogen peroxide, chlorates, bromates, chlorine peroxide, or by any other process which damages the nutritive value of the flour, should be prohibited.

MINERALS

The *total mineral content* would be about doubled.

Iron.—The human daily requirement of iron may be taken as 10 mg. The 1 lb. loaf of 70 % flour would supply about 5 mg.; by the change to flour of 80–85 % extraction this amount would be doubled, and the whole daily requirement of iron would be realised in the bread portion of the diet alone. Anæmia from iron deficiency is a common cause of lowered vitality among poorer women, particularly in pregnancy, and among their infants.

Calcium.—The minimum human daily requirement of calcium may be taken as 500 mg. The 1 lb. loaf of 70 % flour would contain somewhat less than 100 mg., and the loaf of 80–85 % flour would contain somewhat less than 150 mg. An insufficiency of calcium is an important defect in human diets in Great Britain, but it would not be adequately counteracted by increasing the extraction of the flour for bread. Bread is in any case a poor source of calcium; the ordinary foods most rich in calcium are milk and cheese and green vegetables, and every effort should be made to increase the production and consumption of them.

Phosphorus.—The increase in phosphorus would also be very great, but as it is not believed that human diets in Great Britain are liable to be deficient in this element stress is not laid on this point.

Other minerals (*potassium, magnesium, manganese, copper, zinc*).—The fact that other mineral elements would be similarly increased is indisputable, but our knowledge of the human requirement for these and how far it is met in ordinary diets is not yet adequate for assessing the extent of the advantage.

POSSIBLE DISADVANTAGES FROM INCREASED EXTRACTION

Reduced utilisation.—Flours of high extraction if coarsely ground are slightly less well utilised by the body than finer flour. It is partly for this reason that an extraction of 80–85 % has been selected because it represents a fraction of the wheat grain in which the improvement in the nutritive value of the flour is pronounced, but in which the decrease in utilisation has scarcely begun. This lessened utilisation is probably due to the coarseness of the branny particles; if a flour of 90 or even 100 % extraction could be obtained in a finely ground and homogeneous condition its nutritive advantages would be still further enhanced and the disadvantages of incomplete utilisation would tend to disappear. There is little evidence that bread made from flour of high extraction exerts a harmful, irritating effect on normal people. Where it does the effect is probably due to the coarseness of the branny particles. In most cases the slight laxative effect of wholemeal or high-extraction flour might be beneficial.

Increase in content of phytic acid.—Phytic acid precipitates calcium so that it cannot be absorbed. Although high-extraction flour contributes more calcium to the diet it also contributes more compounds of phytic acid. The need for more calcium in the diet in Great Britain is great, and bread, whether made from white flour or flour of higher extraction, must be regarded as a poor source of calcium.

Recommendation 3.—The public would be benefited by the addition of calcium salts to the flour from which bread is made. Bread made from flour thus supplemented should be specially designated. The production and consumption of milk, cheese, and vegetables should at the same time be promoted to the maximum extent, in order to secure an adequate supply of calcium.

BAKING POWDER

The use of baking powder, which produces alkaline conditions, destroys the vitamin-B_1 content of bread, whether made from brown or white flour.

Recommendation 4.—The use of baking powders, which produce alkaline conditions, should be strongly discouraged in making bread or biscuits.

CORRIGENDUM.—In the annotation on viruses in our issue of July 20 (p. 76) the name of the worker who has demonstrated the utility of the fluorescence microscope in this country should have been Dr. F. Himmelweit.

SURVEY OF PUBLIC OPINION

IT took the last war to make the Department of Scientific and Industrial Research and the Medical Research Council integral parts of the state, but since 1918 these two bodies have increasingly been recognised as such. Now in 1940 we see in the daily press the birth-pangs of another scientific effort which if allowed to fructify may be equally important. In the breathing space since 1918 social science has gone forward apace. Methods have been developed for testing public opinion on many subjects and for studying at first hand the conditions of life of the people. This work has proceeded on two separate lines. First there have been the efforts of market-research organisations designed to test the effects of advertising. Most large advertising agencies have field-work sections which explore public reactions to wide-scale advertising campaigns and estimate the efficiency of the various advertising media. These market-research organisations employ door-to-door questioners, who interview a random sample of the population. Secondly, the departments of sociology of the British universities have employed similar methods to study the ways of life of the poorer sections of the community. One of the best of these studies is described in Herbert Tout's "The Standard of Living in Bristol" (Arrowsmith, 1938, 1s.), a comprehensive survey of the economic life of the poorer classes in one of our most prosperous cities. It is not surprising therefore that a Government called on to fight an adversary who uses every facet of science should have decided that these new methods of studying the population would be helpful not only in planning legislation but also in watching the effects of totalitarian war on the community as a whole. It is the duty of the Ministry of Information not only to disseminate but also to collect facts, so it fell to its lot to organise a public-opinion testing machine for the Government. This machine is called the War-time Social Survey. It works under the auspices of the National Institute of Economic and Social Research, the acting director of which is Mr. Geoffrey Crowther, and is thus connected with but separate from the Ministry. The survey works on a random-sample basis. Its supervisors are trained economists, and many of its investigators are trained social workers. It does not use postal questionnaires, for they are often fallacious. In its interviews with something like 10,000 people so far less than one in a hundred have refused to answer the questions, and the great majority have welcomed the opportunity of telling the Government exactly what they think of them. Naturally in assessing answers to the questionnaires many difficulties arise. No-one knows better than doctors that the manner of an answer may be more important than its matter. The trained social worker is however often able to add such an assessment to the bald answers. The investigators' bias has to be calculated and neutralised, and the sampling has to be done most carefully.

An insight into the type of work the survey performs can be obtained from the following typical questions.

1. Have you read a copy of this leaflet? (The interviewer holding in his hand the invasion leaflet.)
2. What have you done with your copy of it?
3. Are you feeling the tea-rationing?
4. Have you yourself had any difficulty in finding a way to do your bit?
5. Have the shops got the things you want apart from food?
6. If not, what do you find it hard to get?
7. Do you think we are getting too much or too little news?

Statistically representative answers to these questions will be of great value to the Government in planning future legislation and publicity. If, for example, only 60% of the public have read the invasion leaflet something must be done about it. If certain sections of the community are for justifiable reasons finding the tea-rationing an undue burden, this again is capable of correction. Similarly public nausea attributed to frequent radio news bulletins can, if discovered, easily be put right. The greatest care is taken to make sure that the names of the persons interviewed, and even the interview sheets, never reach the Ministry of Information. The results are analysed at the National Institute and only these results are available for the Government's use.

The value of a Government social-research organisation has rapidly been appreciated by several departments, and already it has coöperated with the Ministry of Food, the Ministry of Health and the Board of Trade. Its studies have ranged from brown and white bread to milk prices. In the past the Government has relied for its estimation of public opinion on Parliament and the press. These two must continue as the great safeguards of our liberty, but a direct access to the raw material of government, the people themselves, may be an eye-opener to the Civil Service.

In England Now

A Running Commentary by Peripatetic Correspondents

HERE is a new collecting game for doctors. It's called "harbingers" and this is its origin. During a round in a private mental hospital the knowledgeable matron said, "I'm afraid Mrs. S. is going off again—she had a third cup of tea this morning." From long experience she knew this to be the first sign that this charming, cultured, dresden-china lady would in a few days or even hours be a tireless, raging maniac. I asked the matron to make me out a list of similar heralding signs in other patients and I have it still. "Miss H. puts on a black dress and asks for two hot-water bottles. The usually reserved Mr. M. comes up and asks for a cigarette," and so on. At another mental hospital a number of patients were on parole and went out every afternoon. When the door was unlocked they had to cross a courtyard to get to the road. This courtyard had a grass centre with a path round it, and the doctor's office window opened on to it. One afternoon the doctor stood at his window, idly watching the patients as they started out on their walk. Suddenly he turned round and rang for the head attendant: "Go and fetch Mr. So-and-So," naming a patient with recurrent mania who had been rigidly self-controlled and well for some years. "He's gone down the road, he's not well." The doctor had noticed that Mr. So-and-So had cut across the grass—the first sign that the dam was breaking.

But it isn't only mental disease that has these harbingers. A friend of mine with a chronic tuberculous lung tells me that when he is going to have any activity he always gets an increased appreciation of colour and tries to write poetry. "I almost think in rhyme or metre." Another good one I got from the wife of a man who had a regular bi-yearly attack of lumbago, probably a gouty variant. "He always cuts the hedge and rolls the lawn, then he comes in all wet, and sits up at that table and counts his stamp collection, and tots up his Stock Exchange account. Then he wonders why he gets lumbago." I have some other quaint mental harbingers of the common cold and malaria, but probably most people will prefer to make their own collection. After all there is nothing surprising in our sensitive top-sails getting the first puff of an approaching squall.

* * *

It is strange that, despite its importance both for those primarily concerned and now for every inhabitant of this island, there has been no intensive psychological study of the normal, as distinct from the definitely pathological, military mind. I commend such an investigation to our psychologists, many of whom must at the present time have ample material on which to work. Everyone will agree that in many admirable qualities the military is superior to the civilian mind, but in one respect it seems to have been inferior, and this defect has had an important bearing on the outcome of past campaigns. The military mind at all times and in all lands has experienced the greatest difficulty in envisaging any progress in the science and art of war, despite the obvious and rapid progress in sciences ancillary to war. The psychological reasons for this condition are probably complex. It should, however, be possible to find out whether those who adopt the army as a career in peace-time have had essentially conservative minds to begin with, or whether the army training itself has engendered this characteristic. Curiously enough navies and (though

here my experience is more limited) air forces appear to have suffered far less from this resistance to new ideas, although in our navy at any rate both officers and men are recruited at a younger and more impressionable age than they are in the army. The difference in the receptivity to new ideas of navy and army is well illustrated in the history of the Russo-Japanese war. The Japanese army refused to entertain the idea that a diet of polished rice had any connexion with the genesis of beriberi; the navy was prepared to experiment. As a result the army suffered heavily from beriberi, the navy did not.

As Freud and his school have shown in their psycho-analytic studies, much important information on the workings of the military mind may be obtained from a study of history. Again and again one cannot help being astonished at the capacity of the military mind for being taken by surprise by some change in tactics. The military forces of the Egyptian middle empire, for instance, were completely surprised and as completely overwhelmed by the horse-drawn chariots of the Semitic Hyksos, although the Egyptians had for many centuries been in close contact with Asia and Asiatics and must certainly have heard of the existence of the horse. In April, 1915, I happened to be working in a casualty clearing station to which were sent the victims of the first German gas attack. No warning of such an attack had been given to the French territorial regiment involved or to the medical authorities, though it appears that some time previously our intelligence had reported fully on the preparations made by the Germans to use gas. The conservatism of the military mind extends equally to both small and great things. In 1914 many of the Belgian regiments went into action in uniforms, which, if they were not actually those worn by their ancestors at Waterloo, were at least excellent imitations—plum-coloured breeches with bottle-green tunics and silver buttons. The Belgians had had no wars to speak of since those of Napoleonic times, so why should the uniforms which had been up to date in 1815 be changed? The French, too, as they stormed the great dune at Nieuport in 1915, were still clad in the bright red trousers and blue coats which had been so much admired by the military experts of 1870.

It was the distinguished military author of "The Green Curve" who insisted on the close similarity between burglars and generals. Both are limited to a single technique. If it is known how a particular burglar or a particular general has carried out one job of work all is well, for he can be relied on to repeat the same technique again and again. This tendency has repeatedly led to disaster in the face of some change in the methods of the enemy. The Assyrian, whose militarism was responsible for "the burden of Nineveh," owed his invincibility merely to the fact that he provided his mounted archers with heavy armour, while the discovery of the phalanx by the Spartans was one of the main factors in their victory in the Peloponnesian war. The Spartan phalanx, however, collapsed a hundred years later before the Athenian light armed troops, while these in their turn were crushed by the Macedonian phalanx in which the individual phalangite was provided with a somewhat longer spear than the Spartan had used. The technique of the Macedonian phalanx remained static for more than a hundred years with the inevitable result, as Polybius points out, that the phalanx proved quite inadequate to stand up to the mobile Roman legionary who was well adapted for every situation and emergency. In more modern times it was the introduction of the long bow that enabled the English archers at Crécy and Agincourt to mow down the flower of French chivalry, which, like the Bourbon dynasty years later, forgot nothing and learnt nothing. Examples from our own age of the same failure to foresee changes in technique will occur to all. Conservatism has thus been a characteristic of the military mind certainly for hundreds, perhaps for thousands of years. Essential conservatism, in fact, may well have been the reason why the fierce *Homo neanderthalensis* was exterminated by the new-fangled flint technique of modern man. The psychologist who attempts to study the workings of the present-day military mind will have to investigate, in the words of one of my old teachers, "a nest of problems"; he will be lucky if, in the course of his investigations, he does not stir up a nest of hornets.

The information that the long expected convoy would consist chiefly of French soldiers was received with mixed feelings, but the initial shock soon passed. We found that an unexpectedly large proportion of the staff spoke French. Two fluent linguists amongst our students were immediately detailed as interpreters and we were delighted to find that many of the nursing staff possessed all the necessary qualifications to get the language situation under control. Our confidence was justified and at no time were we obliged to call in outside interpreters. The hour came when "nos blessés" arrived—tired, unshaven, but brown with the sun and for the most part cheerful and very glad that their long and trying journey was at last ended. Within an hour of their arrival they were washed or bathed, had had a good tea and were in bed. Most of them were quickly asleep until our surgical staff with their satellites began to roll up their sleeves. Our emergency theatre was soon going strong, the X-ray staff worked like trojans and for thirty-six hours or so a hectic time was had by all. Some of us whose experience went back a quarter of a century had visions of another convoy, of Flanders mud, tetanus and gas gangrene, but thanks to modern methods—and perhaps no mud—these grim memories were not to be revived this time. The "shake-down" took very little time and with their native gallantry and cheerful chatter our patients quickly made themselves at home. The vis medicatrix naturæ helped by the untiring efforts of les médecins and les nourrisses rapidly restored their good spirits.

Then, of course, came the flood of would-be visitors. Every one in the town who had spent a day on a cross-channel steamer proclaimed him or herself a fluent French linguist and wanted to come along to interpret or chat. A little tactful barrier building was necessary before we could keep the flood within bounds. We were short of wireless sets—the want was supplied—and many comforts for the troops were quickly at our disposal including a plentiful supply of vin rouge and beer in wood; our patients didn't keep either waiting very long. There were days when their spirits flagged, for the news from France was bad and getting worse. We did our best to keep them smiling, but the worst part was the absence of family news, though some men managed to get some through before the final word of the armistice came. Meanwhile health was being restored and wounds were healing. Parties were arranged and enjoyed and the town's hospitality was gratefully accepted. Books arrived, including many petits dictionnaires and old school books, and series of informal language lessons were given and received. The "Ici Londres" broadcasts provided a welcome substitute for the French news and soon there were earnest discussions among the men as to their future destiny. Many have now left us to join the Legion—bon chance to them. Others will go home, but wherever they may be, we hope that they will look back with a certain amount of pleasure to their stay at cet hôpital de bons souvenirs.

* * *

That hope springs eternal was brought home to me forcibly when I was besought for help by three distraught-looking women weighed down by babies, string-bags, attaché cases and other appurtenances. They had left Rochester, they said, at 7.30 that morning to visit a soldier son "somewhere in Bucks." Their information as to his whereabouts was a little more precise than that, but at 4 o'clock in the afternoon they were still without any real knowledge of the location of the object of so much devotion. I bundled babies, bags and all into my car and set about the task with the feeling that we should all end up in a madhouse or a police-station. Certainly no-one was more surprised than I when half an hour later success crowned our efforts. I ran some risk of being embraced and left hurriedly, shuddering to think of their return journey from an erstwhile rural mansion 2½ miles from a station to the urban amenities of Kent. On an inadequate allowance of petrol I felt I had done my good deed for the day.

* * *

In the discussion as to where the G.P. comes in in A.R.P. there is a point that might well be noted. A child of my acquaintance, living in a relatively safe rural area, is, on the sounding of the siren, awoken by her fearful aunt and made to dress, descend to the

kitchen and lie under the table. The particular virtue of the kitchen table is not specified, but one night she spent three hours there. The G.P. knows as little as the rest of us of the real risks of aerial bombardment but he might be able to inculcate some sense of proportion in the population he serves. Personally I prefer the other extreme, an example of which is worth quoting. A young officer who spent a day on the beach at Dunkirk was asked what it was like. "Rotten," he replied, "it rained all day."

* * *

Let me commend a side-step into an art gallery if you want to get away from thoughts of war. In the National Gallery we can busy ourselves in British painting since Whistler, and we will come away without any shame at this result of fifty years work, though opinions differ as to what will last. Already we can see how quickly time has put down the mighty from their seats and also how it brings up the less known of a former day. Walter Greaves is chief among these latter—at times a slavish follower of Whistler, the more he is seen the better one realises his real independence. Mark Fisher is another who improves with every year. Here also we can see how many-sided was John Sargent or be amazed at the genius of Augustus John and at the weird contrast in Stanley Spencer, who can vie with Albrecht Dürer in painting vegetation and make the English landscape stand out behind it in all its loveliness, and yet, when he paints the human form, seems to be at the stage of the Eastern-Islander outside the British Museum. From this exhibition we may feel what a pity it was that Conder's life was short; and how right the conservative mind at times may be to refuse to take new art into its survey, how wrong at others. It is youth that judges such things, not age. It is youth that is interested in this exhibition. Except for an R.E. major and his wife I was the only grown-up in the place; the rest were youths, boys and girls at the turn of the teens, with none of the dilettante nonchalance so often noticeable at exhibitions, but all working intently with pencils and catalogues.

IRISH LABOUR FACING HEALTH PROBLEMS

THE Irish Trade Union Congress in session last week at Limerick found time to give attention to public health. The national executive was instructed to take all possible steps to secure: (*a*) extension of benefits from the National Health Insurance Society; (*b*) investigation by the Medical Research Council of the incidence and causes of diseases associated with industries and agricultural occupations; (*c*) the scheduling of all diseases consequent upon a worker's occupation, so that the victim might secure the benefits of the Workmen's Compensation Act; (*d*) government action without delay on the schemes recommended by the Hospitals Commission. The N.H.I. scheme in Ireland, from its inception nearly thirty years ago, has been almost exclusively concerned in providing sick benefits and what little concern it had with treatment was soon abolished. Systems of treatment for insured members have been worked out but so far—partly from the inertia of health administration in Ireland and partly from fear of expense—no step forward has been taken. Little can be effected by grafting a few additional benefits on the existing scheme, but even that little is worth doing. The N.H.I. Society, since the unification of approved societies in 1936, has not ceased to press on the Government the need for a completely remodelled system, based on a study of schemes established in other countries. Unfortunately, in the present state of Europe, such a study is impracticable and any changes that can be made at present are not likely to be more than patching of an outworn garment. The next point raised by the trade-union council is one that should not brook delay. Many new industries have recently been established in Ireland, entailing manufacturing processes hitherto little known in the country. Some of these processes are dust-producing and therefore likely to produce disorders of the respiratory tract unless suitable protective measures are adopted. Others—e.g., in the manufacture of sugar—are irritating to the skin. No investigation has yet been made of the incidence of such diseases, despite its importance from the social as well as the scientific point of view. Until such a survey has been made no protective measures can be devised.

Letters to the Editor

PLASTER

SIR,—I wonder if Mr. Poston has not missed the point of your leader. It does not call for the displacement of surgeons or nurses orthopædically trained from their proper functions, but it does offer a suggestion whereby the very obvious "bottleneck" that appears in all units dealing at high pressure with large batches of wounded may be by-passed.

Under conditions that have occurred in some sectors, and that may occur again all over the country, all the orthopædic teams available could not cope with one-tenth of the work that has to be done. As many wounds as possible must be cleaned, drained and plastered within a few hours. The opportunity is one that, for that batch of casualties, will never come again and every available person must be roped in to ensure that it is used to the full. At such times, if the output of saved lives can be doubled by a division of labour, the young orthopædic surgeon is far better employed in the theatre operating on limb wounds than outside it applying plaster. Also, at such times, it is not a matter of guarding the ranks of a union from dilution with unskilled labour, but of saving lives.

Mr. Poston's qualifications to speak on orthopædic subjects are undoubted, but plaster work is not as difficult as he suggests, nor are dental surgeons as stupid as he seems to imply. They would lead emergency plaster teams well and would be only too glad, when the rush was over, to return to their own work and leave the orthopædic surgeons to theirs.

Harley Street, W.1. W. H. OGILVIE.

SIR,—Professor Pannett asks for simple instructions for applying a plaster spica of the thigh. It should extend from the nipples to the toes, and is applied in three sections. The first section extends from the middle of the patella to the nipple line, the second from knee to ankle, and the third takes in the foot. The casing may be applied directly to the skin, or over a single or double layer of closely fitting stockingette. To protect the sacrum, spinous processes and iliac crests, pads of ¼-inch sticky white felt are usually recommended. My preference is for gamgee, because felt, especially the grey variety, may contain tetanus spores. I have met with a fatality from tetanus infection arising from a pad of grey felt lying near a dressing beneath a plaster casing. Blood soaked into the felt, and it was proved that the pad and the roll from which it was cut contained tetanus spores. If felt is used it should be sterilised, and so for that matter should the stockingette if there is a wound. The trunk and leg portions of the stockingette are retained smoothly in position by a few stitches round the perineum and groin. With the non-padded casing it is not necessary to pad the head of the fibula or back of the heel, but it is best to do so when using stockingette. Before drawing on the stockingette, a dusting powder, equal parts of talc and French chalk, is sprinkled on the skin.

Before beginning to apply a plaster, have all the bandages ready and a sufficient number of buckets of tepid water, so that there is no waiting to get fresh supplies. Stand the bandages on their ends in the water, and lift them out with one hand at each end, expressing the excess of water towards the centre. Unwind the first two inches. The bandage is now ready for use and will not unwind in a spiral.

The patient is lifted on to the special table. If this is not available he is laid with his shoulders resting on a padded box about 8 in. high, the sacrum is supported on a small padded upturned bowl or can of sufficient height, and the legs are held by assistants in the desired position. A sacral rest is usually procurable, and is used in preference to the bowl. A thin woollen bandage, 6 in. broad, is passed round the trunk at the nipple level and serves to retain in position the strip of gamgee or felt, also 6 in. broad, which has been laid along the sacrum and spinous processes.

The first section of the casing is now applied from the middle of the patella to the nipple level, ascending and descending spica turns being used at the hip. About fifteen to twenty plaster bandages, 6 or 8 in. broad and 5 or 6 yards long, are

needed for this section. Each turn is gently rubbed in with the flat of the hand, so as to create a homogeneous whole of uniform thickness throughout. The bandaging is done smoothly, rapidly and without interruption. There must be no constriction or creasing. To avoid creasing, the bandage is held with sufficient tension to prevent this, but without pulling, and as the turns proceed the upper or the lower border of the turn is grasped by the free hand, so as to assist in laying the turn on smoothly. Reverses must not be used. The bandaging is carried well over to the middle line in front and behind the hip, thus covering in the whole of the buttock and moulding the posterior trochanteric, gluteal and sacral areas, so as to obtain an accurate and complete covering. This is the part of the casing which is often badly made, with the result that the hip is not supported posteriorly, and sags out of the casing. This step is aided by pleating or doubling the plaster into folds as the turns cross the great trochanter. The pleated portion, 8–10 in. long, hangs free for a moment and the free hand moulds it firmly right across the buttock to the midline. Ten or twelve of such pleats are enough, and the same procedure is employed anteriorly at the hip, making the pleats travel over to the pubis and adductor region. This pleating process at the hip is worth practising, because it allows of change of direction of the turns without creasing, and reinforces areas of strain. If it is done expertly and well reinforcement of the hip region by plaster slabs may not be necessary, but generally this is done by placing a slab along the anterior, posterior and lateral aspects of the hip. The slabs are 6 in. broad, 12–15 in. long and six layers thick. They may be made beforehand and stored ready for use, folding the ends to the middle in doing so. When needed they are unfolded, dipped in the water, and applied at once very wet and not wrung out; or a slab may be made wet, by unfolding the soaking-wet bandage back and forwards on a glass-topped table, to render it very smooth. As consolidation is about to take place the casing is moulded round and above the iliac crests with the flat of the hands and thenar eminences. It is also firmly moulded over the tuber ischii and between the great trochanter and the iliac crest. Then the hip and the upper part of the thigh are compressed antero-posteriorly, and the lower part of the thigh and the knee laterally, using uniform compression between the palms of the hands.

The next section is applied from the lower third of the thigh to the ankle. My preference is to have the knee flexed about 5° from the extended position, because this takes strain off the ligaments and allows of quicker return of movements afterwards. The posterior free edge of the first section is cut away behind the knee and everted, so as to avoid a sharp edge. A posterior plaster slab, very wet and soppy, is applied smoothly from the lower third of the thigh to the ankle and retained by two circular plaster bandages, 6 in. broad. The knee is strengthened by the assistant placing three plaster slabs, 10 in. long, 3 in. broad and six layers thick, one anteriorly and one on each side of the knee. The setting plaster is moulded to the patella, knee and ankle. The lower anterior edge of the second section is trimmed and everted at the level of the ankle so that the foot may be brought up to the right-angled position.

The third section is now made by placing a posterior slab from the middle of the calf to an inch beyond the toes, the foot being strictly neutral as to inversion or eversion. To ensure snug fitting without any creasing as it rounds the curve of the heel two transverse scissor cuts, about 1 in. deep, are cut in the sides of the slab at this level, so that the edges may overlap smoothly. The slab is retained in position by two circular plaster bandages and the dorsum of the toes are exposed by trimming the plaster as far as the webs. Mould the plaster to the longitudinal and transverse metatarsal arches and be sure to leave the plantar aspects of the toes supported by the slab. Thus one can encourage active movements of the toes and prevent painful, rigid clawing of the forefoot, a sequel which is not uncommon if these details are not attended to in applying the plaster casing to the foot. The ends of the stockingette are turned back to be incorporated by the last turn of the bandage which passes round the toes. The same is done at the upper end of the casing after it has been neatly trimmed at the edges. The edge of the plaster is cut away over the sound groin, so that the thigh may be flexed to a right angle. A window in the epigastrium 4 in. long and 3 in. broad is cut next day, and a small incision may be made through the plaster here at the time of application so that the shears may be readily introduced later to cut the window.

The assistant who is supporting the limb must do so with the flat of the hands to avoid indentation of the plaster, and when it has consolidated he may lay the heel down on a table with a roll of wool placed under it. The patient must not be moved from his position on the special table or sacral rest until the casing is strongly set, for fear of its cracking. This may take fifteen or twenty minutes, and the time is spent by trimming the edges of the casing at the pubis, groin and adductor regions. Care is taken not to cut too much away. A hot-air dryer such as hair-dressers use is useful in hastening the setting. When it is deemed safe to lift the patient on to the trolley, great care is exercised not to strain the casing at the hip especially. If the assistant holds the leg and thigh part of the casing at the proper angle, the patient may be rolled over on to his well side, to have the casing trimmed posteriorly at its upper limit and at the sacrum and buttock. The edges of the sacral and buttock portion of the casing must be trimmed sparingly and just sufficiently to allow room for the nurse's hand to be slipped along the sacrum to apply spirit and powder during the routine nursing of the case. To be on the safe side, for avoiding cracking and breaking of the hip part of the spica, it is better to leave the trimming of these areas till next day when the casing is thoroughly hard. When the patient is on his side, if the buttock has not been covered adequately, opportunity of this position is taken to do so. When the patient is returned to bed, he should lie on a firm mattress with fracture boards beneath it. The leg is supported on a soft, shallow pillow or suspended to a beam with just enough weight to carry the load. The patient is given a hand pulley above his head, and it is a good plan to put a shock cage over the casing to permit of rapid drying of the casing. If the bed-clothes are put on at once, evaporation cannot occur, and in some cases proper setting will not take place if this is done.

The casing need not be thick, and about ¼ in. thickness is enough, the reinforced parts being about as thick again. If a double spica is used, a wooden bar, 1 in. thick, is incorporated between the thigh or calf portions of the consolidated plaster to prevent breaking by leverage when the patient is lifted.

The same methods are used in a shoulder spica with the arm in abduction. A good grip of the pelvis is advisable. The slab reinforcements are placed anteriorly, posteriorly and below the axilla. When the casing has consolidated a strut of Gooch splinting 4 in. broad, covered with a few turns of plaster bandage, may be used to bridge the gap between the elbow and the iliac crest. A pad beneath the medial epicondyle is advisable to protect the ulnar nerve. If the spica is not to be brought down as far as the pelvis, turns of the plaster bandage are to be carried over the opposite shoulder. In making the spica it is best to take half turns round the axilla and shoulder as in bandaging a breast case after radical removal for carcinoma. The half turn avoids any chance of constriction. The spica is usually put on with the arm abducted about 70° and with the elbow carried forwards so that it lies in line with the anterior chest wall. The position is that which the shoulder occupies in carrying the hand to the mouth.

Edinburgh. W. A. COCHRANE.

THE TIME FOR UNITY

SIR,—When commenting, last November, on the lucubrations of your Special Commissioner, I wrote: "A state medical service, it seems, is to be foisted on the public, and on consultants, surreptitiously and in war-time, without submission either to Parliament or to the consultants." This prophecy has been fulfilled. The state medical service is not coming; it has arrived. Alone amongst all other professions or occupations doctors have been singled out for conscription irrespective of age. From now onwards each one of us, old or young, general practitioner or consultant, may at any time be compelled to work full time at a hospital in any part of the country. It is true that for the moment this conscription is applicable only to those within two years of qualification. But it is manifest that, at a stroke of the pen, this law may become applicable without age limit. Who, it may be asked, is responsible for this momentous decision? It has been made at the request of the Central Emergency Committee. This is a body of 38 members, on which, in my view, the staffs of the

teaching schools, who are particularly interested in the disposal of the newly qualified, have an entirely inadequate representation. So far as I am aware this committee has acted without first taking the opinion of the Royal Colleges or of any other professional body. The Committee of Reference, I understand, has met three times since April. It has not been consulted on this matter, nor has the Advisory Emergency Hospital Medical Service Committee, which last met on May 30.

Let me make it clear that I am not criticising this decision as such. I think it was right, and indeed inevitable. But I submit that action with implications of such overwhelming importance to every member of the profession should not have been taken by the Central Emergency Committee without prior consultation with other representative professional bodies.

Truly, Sir, this is "The Time for Unity." Never was unity more vital to the profession than it is today. It is futile to call one another "conservatives" and "die-hards" on the one hand, or "gauleiters" and "reds" on the other. Whatever our political colour, we are surely unanimous in a fervent determination that our profession shall be so reorganised that we can serve our country with a maximum of efficiency and with a minimum of bureaucratic control. Can we not exorcise the spirit of mutual suspicion and distrust which has so long existed between consultants and the British Medical Association? There have been faults on both sides. Rightly or wrongly, the average consultant regards the B.M.A. as a body whose primary object is to further the interests of the general practitioner, and he holds himself aloof from its deliberations, if indeed he even joins the association. There is a feeling, too, that the association does not coöperate as it should with the Royal Colleges, and that consultants attached to medical schools are inadequately represented on its committees. I venture therefore to appeal to every consultant to join the association, to take an active part in its meetings, and to see to it that the right men are appointed as his representatives on association committees. I appeal at the same time to the officials of the association, for whose outstanding ability and devoted public spirit I personally have the warmest admiration, to do everything in their power to further a more harmonious coöperation between the association, the Royal Colleges, and the staffs of medical schools. In a word, let us all do our best to ensure that when the Government goes to the association for advice the association will be truly representative of the whole profession, and not, as some assert, of only sectional interests.

London, W.1. MAURICE CASSIDY.

SIR,—You suggest that present and future problems of medical service can best be solved by the "enrolment of the whole profession in a unified salaried national service, whose members can be drafted wherever they are most wanted"; we should like to draw attention to the fact that a scheme of this kind was put forward by the Westminster and Holborn division of the British Medical Association in their 1938–39 session and enthusiastically supported by its members. We are still of opinion that had such an enrolment of the profession under a director-general been effected at that time, well in advance of the outbreak of war, many difficulties of war-time practice and appointment would have been avoided.

GILBERT ORME,
Chairman, W. and H. Div. B.M.A.

E. L. HOPEWELL-ASH,
Chairman, W. and H. Div. B.M.A. 1938-39.

London, W.

SIR,—The time for unity has certainly arrived, but there is need for clear thinking with regard to the various possibilities suggested by the slogan. Many of your correspondents reflect the contradictions implicit in your editorial. Others are just scared. The fear of "state medicine" accompanies an acceptance of its inevitability and a plea that it must be "only for the duration." The old bogy-word totalitarianism is trotted out. Organisation is confused with nazism. The needs of the people tend to be looked upon as secondary to the preservation of as much of the status quo as possible. And the war is regarded as a historical accident that has temporarily disturbed our peaceful lives.

One correspondent wants to know what body of medical opinion is represented by your editorial. That is for you to tell us, but there is a considerable body of Socialist opinion that has for years been campaigning for a unified salaried medical service as one of the basic essentials for the future of the health services of this country. The arguments brought forward in favour of such a service in war-time are equally applicable in time of peace. But it is no longer sufficient just to agitate for unity. Abstract discussions on organisation isolated from economics and politics are sterile. Certainly we are against any form of fascism. There can be no excuse for extending fascist methods here under the plea of fighting fascism elsewhere. The health services of this country must be subject to the control of the elected representatives of the people. The local authorities with fully restored political and executive rights must have charge of local administration under a ministry of health and a government purged of all pro-nazi elements or fascist sympathisers.

The people (and doctors) of this country are capable of dealing with all the minor difficulties involved in unification. Here, as in every other sphere, the only hope for the people of this island lies in the coming to power of a government that will trust the people—which can only be when the people trust the government.

RUSCOE CLARKE.

Central Middlesex County Hospital, N.W.10.

SIR,—Your leading article has excited wide interest both on account of the subject which it presents for your readers' consideration—namely, a state medical service—and also on account of the form of its presentation. The medical profession is fully aware of the need for improving the service it renders to the people of England. In your efforts to achieve this capital object you can be sure of the sympathy and support of the vast majority of us doctors. But I believe that you will more certainly succeed if you keep in mind the sturdy independence of British character and our desire for freedom. As General Smuts said in a recent broadcast to the British Empire and the U.S.A., "this war is a war for freedom if ever there was one." He also made a pertinent remark to the effect that to win the war we must perfect our organisation and submit to discipline.

I imagine that if the writer of your leading article were to read this letter he would agree with what I am writing. It is indeed obvious that he wants to improve the medical services of the country, and he believes in organisation and discipline. By his plan, too, he is no doubt satisfied that he would increase the sum total of freedom by a wider distribution of it. Since we are all out for the same end he must be surprised at the irritation expressed in letters you have published about the article in question. It is the method of approach rather than the subject itself which has disturbed some of your readers. It may be euphemistically called the continental method, and recent happenings abroad have familiarised us with its technique.

The first step (in approach) is attack on an object which is maliciously distorted. The editorial in question opens its attack by calling peace-time doctors largely luxuries, and by dubbing our profession in this respect a "trade." It is an effective method of attack because it immediately arouses emotion. Blood surges to the arms to fight (I hope no physiologist will read this too critically) and to the legs to help them run away, and the anæmic higher faculties are no longer able to appraise the half-truth presented for consideration. The rich get more medical attention than the poor. We doctors are paid for the services we render. We are all in the same boat. We are all alike because we are all heavier than water, and we shall all touch bottom if the ship sinks. There is no reference to the captain, coxswain or men at the oars, nor to the weaklings in the boat who are unable or unwilling to do their bit. As to other omissions of fact and perversions of truth much else might be said.

And now the attack is launched. The next step is to create the animus to maintain the attack. The first call is on fear, that overriding emotion and bugbear of humanity. We are told that large sections of our profession are to be saved from bankruptcy, a statement

which contains the foreboding suggestion that many of us are on the brink of insolvency. The next call is on self-interest. We are told that a way will have to be found to protect doctors from financial ruin owing to the loss of their capital invested in their practices. The question of fees is to be settled, and every member of the profession will be enrolled in a salaried national service. Whether good or bad in fact all doctors will be cared for. The spectre of poverty and starvation is laid low, and now the flock of sheep are marshalled. Animated by fear and self-interest they have been transformed into a dangerous pack of wolves as likely to turn their newly aroused lust for destruction on one another as on the enemy. They must be controlled at once. In the control and direction of the machine to be created personal responsibility, one of the great principles of democracy, is discounted. We are told that a controlling body, with dictatorial powers, free from sectional attachments, will determine what work we doctors shall do, and also where we shall do it.

I am not suggesting that THE LANCET is imbued with Nazi doctrine, but the children's game of follow-my-leader is often played by adults without their knowing it.

Portland Place, W.1. GEOFFREY EVANS.

SIR,—Like many other doctors I contend—and I believe we could substantiate the contention—that the public is well served under the present system, and that the majority of doctors make a living, in moderately happy circumstances, in existing conditions. And am I not right in supposing that the majority of supporters of a whole-time service are not convinced of its merits by inductive reasoning, but by deduction from totally unsubstantiated premises, which they have accepted for reasons quite unconnected with medicine?

A. PINEY.

SOLDIERS' DOCTOR

SIR,—It may be, when I say I have known patients made worse by excessive or ill-advised modern diagnostic methods, that I do not know what a "true neurosis" is; but it is certain that when the doctors of Denbigh use the word "discipline" they do so with a different meaning from that which Pertinax and I imply. Discipline does not mean the running in before the C.O. of a person of lower rank than oneself through the agency of a Garrison Theatre sergeant-major. It means the fusion of the activities of a number of persons so that they become a happy band of brothers, called a "unit," working together for the benefit of the community. The Army Act and the Manual of Military Law are no more in evidence in the daily life of such a unit than are the trade-union rules in the life of a well-run factory. These are the powers to be used when the discipline breaks down. The medicine that fits this discipline *can* cure and prevent those neuroses to which all of us are liable, especially when faced with fear, worn out by fatigue, or bored by idleness and monotony. It is the medicine of all those that have the healing touch, of the old country doctor who knows every one of his patients since birth, of the unqualified practitioner who gets his success where all of us on the register have failed. It is the basis of much consulting work, and of the treatment of convalescence. It is shared by the M.O. of a battalion with all doctors in charge of a conventual body such as a boarding-school or a home for foundling babes. It will become more important after the war as every factory comes to have its own doctor. But, in its full development, it is a special form of medicine that takes time to pick up; and that is why Major Mayne, who has been at it for years, disagrees in detail with Lieutenant Leigh who has but just taken it up. The important thing is that the latter, with many other young men who have joined the forces, has begun to learn it; whereas the doctors of Denbigh do not seem even to know of its existence. It is because so many doctors share their ignorance that the suggestion of Sir Ernest Graham-Little to give high rank to the medical superintendents of civilian hospitals dealing with members of the forces is so wrong. To put a doctor into uniform does not make a soldier of him; and to put all the powers of a stipendiary magistrate into the hands of a medical superintendent who holds the views of the doctors of Denbigh in discipline would be an injustice to all ranks admitted under his charge to whom he temporarily stands in the position of C.O. It would be well if all doctors learnt that to be a soldiers' doctor is a special job.

London. T. B. LAYTON.

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

SIR,—I wish to acknowledge the comments and criticisms on my articles under the above title which have appeared in your correspondence columns. These letters are all written by men who speak with the authority of long experience of the subject, and they have helped to clear and readjust my own views. It would be difficult and tedious to discuss in detail the points they have raised; it will be more useful if I give my reply in the form of a short summary of the problem.

The period of life dealt with—the first month and the first year—is short but significant. It is closely related to birth and pregnancy, and it is influential on later childhood. Infant and child health is closely bound up with the health of the mother; and no less with her knowledge, her intelligence and her conscience. It is also powerfully affected by conditions of environment which favour or prejudice health—housing, hygiene, &c. The welfare of mother and child is inseparable. The problem of child health covers the whole life, physical and spiritual, of the child and the mother, and affects the prosperity of that oldest and most stable of human societies—the family.

This subject of health in the first year of life has three aspects: the elucidation and enlargement of knowledge by research; the imparting of that knowledge by teaching; and its practice in the home. The material of study and teaching is to be found in the nurseries and child welfare clinics of maternity hospitals, but it must be supplemented by study of the conditions in the home. The students to be taught are doctors and nurses; and of the two groups the more important are the nurses. But it must be remembered that these students of infant and child-health do not *practice* the subject: in their turn they become the teachers of the mother. The final objective is, therefore, the education of the mother; she is the practitioner and family doctor of the health of the child.

University of Edinburgh. CHARLES MCNEIL.

A REINFORCED LOAF

SIR,—The Ministry of Health announces that vitamin B_1 and a calcium salt are to be added to bread. This procedure, according to the *Times* parliamentary report, has now been endorsed by the scientific committee and is heralded as "a revolutionary step." The virtues of whole-meal bread have been often debated and I do not propose to reiterate the arguments, but I wish to question the advisability of the revolutionary step.

Vitamin B_1 is partially destroyed by heat. As it will presumably be put into the bread before baking some of the vitamin B_1 will be destroyed. The Ministry realise that some months must elapse before sufficient vitamin B_1 is available to start the scheme, yet they propose putting it into a food in which some will be destroyed. I have assumed we can afford to waste no vitamin B_1, but this is hardly the truth. Have any cases of vitamin B_1 deficiency occurred recently in Britain except among those whose intake of alcohol has been so great as to prevent their having anything like an ordinary diet? I believe the answer is no, although this is not true of pellagra, due to B_2 deficiency. The English diet, though it does not favour whole-meal bread, is apparently not lacking in vitamin B_1.

We are not told what calcium salt is to be added to bread. An inorganic salt would stand little chance of absorption. Most of our calcium is derived from milk, where linked to caseinogen it is easily absorbable. The present milk policy should secure an ample supply for every child and adult.

Nobody welcomes improvements in our diet more than I do. Nevertheless, I regard "the revolutionary step" of adding vitamin B_1 and a calcium salt to white bread as unscientific, wasteful, and unnatural.

Rugby. R. E. SMITH.

Parliament

MEDICINES AND THE FINANCE BILL

THE proposal to embody in the Finance Bill provisions which will extend the principle that medicines and the raw materials from which they are made are articles of luxury suitable for taxation will be contested when the bill reaches the committee stage in the House of Commons. It is expected also that pressure will be brought to bear on the Chancellor of the Exchequer to include in the schedule of goods to be exempt from taxation surgical dressings and medical, surgical, dental and dissecting instruments or appliances. In his budget statement the Chancellor said he proposed to include "medicines" in the schedule of articles subject to the lower rate of 16⅔% of their wholesale value, with the exception of "certain drugs which have to be taken for long periods and sometimes, as in the case of diabetic patients, for life," which would be exempt. A very wide range of articles would fall into the "long-period" category and it would be extremely difficult to compile a list which would ensure for patients the continuation of necessary treatment without increasing the already heavy burden which they have to bear. Even if such a list could be drawn up the objection to the principle of taxing the sick and injured would still remain; more especially does it appear a wrong principle when it is considered that the cost of medicines to patients often becomes extremely burdensome in times of sickness when increased expenditure is accompanied by a fall in income.

FROM THE PRESS GALLERY

PARLIAMENTARY interest during the past week has been mainly concentrated on the supplementary budget, which, notwithstanding the immensely greater calls it makes on the taxpayer, still leaves an excess of expenditure over revenue of £2200 million. Even in these days, when ordinary financial standards are willingly set aside for the sake of maximum war effort, members of the House of Commons as guardians of the public purse could not but be gravely impressed with the implications of the tremendous figures which Sir Kingsley Wood laid before them. The best part of two days of parliamentary time in the Commons was taken up by discussion of the budget resolutions. No really fundamental divergence of view was revealed in any quarter, and criticism was mainly confined to matters of detail. A few members would have preferred the Chancellor to take his courage in both hands and ask for larger sacrifices at once, but for the most part there was a feeling of relief that the new taxes were less severe than had been expected. In any case it was generally recognised that it cannot be long before fresh demands are made. On July 25 several useful hours were occupied in examination of the Workmen's Compensation (Supplementary Allowances) (No. 2) Bill in committee and final stages. Labour members, especially those representing the Pottery district and other areas particularly affected, expressed great satisfaction that after many years of agitation this measure would now confer increased benefits on many men and women who were suffering from silicosis and asbestosis. The hope was also expressed that bysinosis would be included when an agreement had been worked out. A warm tribute was paid by one speaker to those who were appointed by the Medical Research Council to conduct an investigation into the problem of silicosis among coalminers. While there was no desire to hurry the investigation unduly, he said, it was hoped that the report of these able scientists would be available before long. The bill received a unanimous third reading.

QUESTION TIME

Recruiting Boards

In reply to a question Mr. ERNEST BEVIN, Minister of Labour, said: I am not aware of any general dissatisfaction among medical practitioners at the present method of distributing the work of the recruiting boards. The recent increase in the work consequent upon the acceleration in the calling up of men has made it necessary to make more frequent calls on the services of panel members. Additional boards have, however, been appointed and the total number of panel members now exceeds 3600.

Sir E. GRAHAM-LITTLE: What is complained of is the unequal distribution of the work, because while some practitioners in a district get five or six boards a week other practitioners, equally competent, get none.—Mr. BEVIN: I think that that would be a good point for the doctors' trade-union to raise.

Health Insurance Benefits

Mr. D. J. LITTLE asked the Minister of Health if, as owing to the increased cost of living much suffering was being caused by the small allowance paid, especially to those suffering from chronic illness, as health insurance benefit, he would take immediate steps to have the act so amended that the benefits might be increased to an amount sufficient to provide the necessaries of life for these people.—Mr. M. MACDONALD replied: The benefits under the national health insurance scheme were never intended to cover the whole cost of maintenance of the insured person during sickness. From its inception in 1911 the scheme was designed to provide in return for such a flat rate of contribution as could reasonably be imposed on all workers a payment during sickness at such rate as that contribution would cover on an actuarial basis, it being left to each worker to provide by private insurance or otherwise for supplementing that payment to meet his own individual needs. Proposals on the lines suggested would involve a large increase in the contributions payable by the workers and their employers and would necessitate a large-scale recasting of the scheme.

Remedial and Vocational Training

In reply to a question addressed to the Minister of Pensions Sir W. WOMERSLEY stated: The subject of both remedial and vocational training for men disabled as a result of service is now under active consideration between my own department and the Ministries of Health and Labour, and the case of the limbless man will naturally be treated as an important part of the problem. It is the practice to provide articulated limbs as early as possible in order to hasten the resumption of normal activities, but temporary plaster pylons will continue to be supplied where their employment is specially indicated and adequate supplies of the necessary materials are being maintained.

The Nation's Dietary

Mr. H. J. PARKER asked the Parliamentary Secretary to the Ministry of Food whether the cheap milk scheme could be extended to invalids and persons dependent upon unemployment assistance of various kinds.—Mr. R. BOOTHBY replied: The National Milk Scheme, which includes within its scope all expectant and nursing mothers and children under five years of age, has only recently been brought into operation. I am unable at present to consider its extension to other categories of the population.

Mr. ROSTRON DUCKWORTH: What would be the cost of adding the new vitamin B_1 to a 2 lb. loaf of bread?—Mr. BOOTHBY: I am advised that the cost of adding the new vitamin B_1 to the flour used in producing a 2 lb. loaf of bread will be about one-twentieth of a penny.

Mr GEORGE GRIFFITHS asked the Secretary of State for War whether some revision in the Army's diet would be made to include a greater amount of fresh vegetables and fruit so as to reduce the number of boils, &c., from which men had been suffering.—Sir E. GRIGG replied: The Army ration has been carefully investigated by the expert research workers of the Medical Research Council and contains an ample supply of vitamins. The ration of fresh vegetables (potatoes 12 oz., other vegetables 6 oz.) is ample. The incidence of the diseases of areolar tissue among the troops for the first four months of this year was one-third of the normal peace-time rate.

Medical Care of the Forces

Sir FRANCIS FREMANTLE asked the Secretary of State for War what arrangement was made for the medical care and treatment of men of the Home Guard when on duty; and whether he had considered an offer by the secretary of the Central Medical War Committee to ask civil practitioners to undertake this duty as their contribution to home defence.—Sir E. GRIGG, Financial Secretary to the War Office, replied: Free medical care and treatment is provided for men of the Home Guard when on duty. It is proposed to take full

advantage of the generous offer made by the Central Medical War Committee.

Mr. L. SILKIN asked the Secretary of State for War whether he would give consideration to the recognition of members of the Joint Council of Chiropodists for treating the forces.—Mr. A. EDEN replied: This matter has been considered, and, as a result, it is proposed to enlist into the R.A.M.C., for duty in training centres, a limited number of chiropodists who are members of associations recognised by the British Medical Association.

Medical Staff of the Home Office

Sir FRANCIS FREMANTLE asked the Home Secretary when the whole medical staff of the Home Office was transferred to the Ministry of Labour, and on whom he now depended for medical advice in dealing with the problem of silicosis.—Sir JOHN ANDERSON replied: For the purpose of the administration of the Factories Act, the medical inspectors of factories were transferred to the Ministry of Labour at the beginning of this month, together with the rest of the Factory department of the Home Office; but they are still available to advise me on workmen's compensation questions relating to silicosis and other industrial diseases.

Paper for Scientific Publications

Sir THOMAS MOORE asked the Minister of Supply whether he could give an assurance that in the limitation of paper supplies due regard would be had for the relative importance of various publications, and that reasonable preference would be given to the requirements of those publishing educational, scientific and technical journals and books.—Mr. HAROLD MACMILLAN, Parliamentary Secretary to the Ministry of Supply, replied: While the Minister cannot accept the responsibility for introducing in the allocation of the limited supplies of paper anything which might savour of a censorship, due regard will be had to the provision of reasonable amounts of paper for educational, scientific and technical publications.

Medical News

University of Oxford

B.M.—On July 27 this degree was conferred on B. R. Mitchell, G. H. Grant, R. G. P. Almond, and J. L. Pinnger.

University of London

At recent examinations the following were successful:—

Branch I (Medicine).—P. R. K. Coe, P. H. Denton, John de Swiet, Jack Hartsilver, G. A. Kiloh, D. de la C. MacCarthy, John Pemberton, G. R. Steed, Gladys M. Tullidge, Eluned Woodford-Williams (*university medal*), A. L. Wyman and C. A. Young.

Branch II (Pathology).—Mary Barber.

Branch IV (Midwifery and Diseases of Women).—Mary D. Daley, H. L. M. Roualle and D. J. N. Smith.

Branch V (Hygiene).—E. C. H. Huddy and Emily L. Simon.

Royal College of Physicians of London

At a meeting of the college held on July 25, with Sir Robert Hutchison, the president, in the chair, the following fellows were elected officers for the ensuing collegiate year:—

Censors: Dr. Anthony Feiling, Dr. Douglas Firth, Prof. F. S. Langmead, and Prof. John A. Ryle. Treasurer: Sir Charles Wilson. Registrar: Dr. H. L. Tidy. Harveian librarian: Dr. Arnold Chaplin. Assistant Registrar: Dr. Reginald Hilton. Library committee: Dr. Herbert Spencer, Dr. J. D. Rolleston, Sir Frederic Still, and Dr. Charles Newman. Finance Committee: Dr. A. M. H. Gray, Dr. J. Purdon Martin, and Dr. H. E. A. Boldero.

The following were elected examiners:—

Chemistry: Mr. Leslie Brown, Prof. W. B. Tuck, D.Sc. Physics: Mr. D. Orson Wood, Prof. F. L. Hopwood, D.Sc. Materia medica and pharmacology: Dr. E. B. Verney, F.R.S., Dr. Clifford Hoyle, Dr. H. A. Dunlop, Dr. J. W. de W. Thornton, and Prof. J. H. Gaddum. Physiology: Prof. B. A. McSwiney, and Prof. R. J. Brocklehurst. Anatomy: Prof. R. D. Lockhart. Pathology: Dr. Geoffrey Bourne, Prof. J. H. Dible, Dr. F. J. Nattrass, Prof. G. Payling Wright. Medical anatomy and principles and practice of medicine: Prof. G. W. Watson, Dr. George Graham, Sir Charles Wilson, Prof. O. L. V. S. de Wesselow, Prof. F. E. Tylecote, Dr. Izod Bennett, Dr. Geoffrey Marshall, Dr. Hugh Gainsborough, Dr. R. A. Hickling, Dr. D. T. Davies, Dr. Kenneth Harris, and Dr. H. H. Carleton. Midwifery and diseases peculiar to women: Mr. Clifford White, Mr. D. W. Roy, Prof. A. Leyland Robinson, Mr. Frederick Roques, and Mr. Arthur Gray. Public health: Dr. J. M. Hamill, and Dr. James Ferguson. Tropical medicine: Prof. Warrington Yorke, F.R.S., and Prof. P. A. Buxton. Ophthalmic medicine and surgery: Dr. J. Purdon Martin. Psychological medicine: Dr. E. B. Strauss, Dr. C. P. Symonds, and Dr. A. A. W. Petrie. Laryngology and otology: Mr. Lionel Colledge. Medical radiology: Mr. Gilbert Stead and Dr. S. Cochrane Shanks. Anæsthetics: Dr. C. Langton Hewer. Child health: Dr. H. C. Cameron and Dr. Norman Capon.

Sir Farquhar Buzzard was appointed Harveian orator and Dr. S. W. Patterson as Bradshaw lecturer for 1941. Lord Horder will deliver the Harveian oration on Oct. 18. The Gilbert Blane gold medal was awarded to Surgeon Lieut.-Commander P. K. Fraser. Prof. G. W. Watson was elected representative on the council of King's College, University of Durham.

The following having satisfied the censors' board were admitted to the membership:—

K. M. Bhansali, M.B.Lond.; R. G. Bickford, M.B.Camb.; R. D. Blachford, M.B.Lond.; R. C. Browne, M.B.Oxfd.; R. V. Coxon, M.B.Lond.; M. D. Deshmukh, M.B.Bombay; M. G. El Dabe, M.B.Cairo; F. K. Khosrawy, M.B.Bombay; R. S. Lawrie, M.B.Lond; H. G. Miller, M.D.Durh.; S. K. Mukherjee, M.B.Calcutta; D. C. Mullally, M.D.Belf.; Hendrik Muller, M.B.Oxfd.; P. W. Nathan, M.B.Lond.; C. D. Needham, M.B.Lond.; C. P. Petch, M.B.Camb.; Gaya Prasad, M.D.Patna; J. B. Rennie, M.D.Glasg.; V. C. Robinson, M.B.Camb.; W. H. S. St. John-Brooks, M.B.Camb.; D. A. Sanford, M.B.Lond.; L. M. Sanghvi, M.B.Bombay; John de Swiet, M.B.Lond.; R. J. Twort, M.B.Aberd.; Eluned Woodford-Williams, M.B.Lond., L.R.C.P.; J. L. Woodhouse, M.D.Lond.; A. L. Wyman, M.B.Lond., and Mohammad Zia-Ullah, M.B.Punjab.

Licences to practise were conferred upon 280 candidates (248 men and 32 women) who have passed the final examination of the conjoint board:—

Phyllis L. F. Acland-Hood, J. K. Adamson, David Adler, C. U. Aitchison, Benjamin Alhadeff, Lavinia S. Alington, M. G. Allen, Katharine M. Angus, Isaac Ansell, E. D. Arkell, B. P. Armstrong, J. P. Baker, D. N. Balsekar, Gwendolyn F. Barber, N. K. Barber, O. H. Belam, W. H. Bennison, A. P. Bentall, R. G. Birch, Gertrude K. Birchenough, Betty C. Bloxham, R. D. Borthwick, G. C. Bough, G. B. Bowater, R. A. Bowen, A. I. W. Boyd, Annie E. Brown, D. J. Browne, J. W. M. Bullen, J. C. Bulstrode, D. W. Burnford, R. H. Butcher, A. C. Camm, R. L. Canney, Kanval Chander, G. H. G. Chase, M. S. Chayen, Donald Chisholm, Owen Clarke, W. H. Clarke, Louis Clement, W. G. F. Clunies-Ross, G. R. V. Coombs, C. C. Corfield, A. G. C. Cox, J. G. Craddock, J. G. Cutts, William Darby, A. K. Das, E. O. Davies, Lorna M. M. Davies, Mary R. Davies, G. S. Davis, A. M. Dawes, P. A. Dawes, Hilda M. Dean, R. F. Devlin, P. D. Dhameja, F. L. Dickson, S. C. Dobson, W. M. M. Douglass, R. L. Dreifuss, E. H. Eason, M. C. Edmond, W. G. Edwards, A. R. Elson, A. M. Evans, B. I. Evans, C. C. Evans, I. H. Evans, W. M. Evans, I. G. Fergusson, J. D. Finnegan, Robert Flew, D. M. Forster, Mary Foster, A. M. Fraser, E. S. Frazer, James Freeman, J. F. G. Garden, Frances V. Gardner, P. H. Garrard, E. I. Garratt, S. C. Gold, Harry Goldcup, Peter Goodman, Sidney Gould, M. C. Graham, Michael Grolman, F. W. Guanziroli, H. P. Guerrier, A. N. Guthkelch, M. J. Hackett, R. C. M. Hadden, M. H. K. Haggie, A. G. Hall, Morgan Hall, Trevan Hambly, D. A. Hamilton, Doreen S. Harker, A. R. Harrison, J. C. Harrison, T. E. Harvey, R. T. Hastings-James, Stanley Haythornthwaite, D. S. Hayton-Williams, R. F. Hendtlass, A. P. Heneghan, Kathleen Hodkinson, D. G. Horan, Denys Horton, J. B. Houghton, G. F. Houston, D. E. Jarman, P. G. Jeffries, A. O. John, C. L. Johnston, D. G. G. Jones, E. B. Jones, E. E. Jones, E. W. Jones, John Jones, J. C. Jones, J. E. C. Jones, S. L. Jones, Elspeth M. Kaye, J. H. Keesey, Eli Keidan, R. K. I. Kennedy, A. W. Kennett, M. D. Kipling, Richard Kobylinski, Alexander Lang, Mary E. Larg, J. A. Learner, J. M. Lees, Myer Leibson, Gershon Levy, C. B. Limerick, J. M. Lipscomb, J. A. Little, Frank Livesey, Anne N. M. Llewhelin, J. T. A. Lloyd, Mary E. Lloyd, J. A. N. Lock, J. L. McCallum, T. P. W. McCarthy, Wallace McConnell, J. A MacDonald, I. M. G MacKay, K. C. MacKelvie, W. D. Mail, E. T. Manley, Winifred M. Markham, H. R. Marrett, T. S. Marshall, Timothy Marshall, M. P. Martin, Gordon Mason-Walshaw, V. F. Masters, Alexander Mathison, K. H. Mehta, K. J. Merris, J. J. Messent, I. H. Meyer, Margaret Middleton, J. E. Miller, R. I. Milne, R. S. Monro, D. G. Morris, Solle Moss, C. E. S. Myers, T. N. Nauth-Misir, F. R. Neubert, F. W. Newby-Good, J. R. O'Brien, B. H. O'Dowd, R. G. Paley, R. W. Palmer, D. A. Parker, W. H. Parkinson, M. J. Parsonage, J. F. Paxton, C. W. Peck, P. M. Peters, Ernest Petrie, D. N. Philip, T. B. W. Phillips, B. A. Protheroe, R. C. B. Pugh, J. M. Pullan, D. W. Quantrill, A. E. Ram, D. C. Rawlins, M. P. G. Rawlinson, J. H. Rees, D. G. Reinold, Courtney Remington-Hobbs, G. J. Reynolds, R. G. Richards, R. H. Rickards, D. B. Roberts, T. W. L. Roberts, W. N. Rollason, E. R. Roseveare, Deulwyn Rosser, R. N. Rycroft, S. M. Sadiq, N. F. Saher, Heinz Salz, R. A. Sandison, Emanuel Saphier, Edmond Scott, William Sewell, H. A. Shaw, J. V. Sheldon, R. A. Shooter, G. F. G. Siggins, Mary C. Simpson, Lesley P. Sitwell, N. S. Slater, C. G. F. Smartt, Daisy M. Smith, Honor M. V. Smith, L. W. Smith, Margaret J. Smith, J. H. Smitham, D. R. Sneligrove, Neville Southwell, Irene J. Stark, G. E. Stein, Ruth M. Stevenson, C. W. Stewart, A. B. Stratton, G. W. E. Studley, Carlos Suarez, P. V. Suckling, C. S. N. Swan, T. D. V. Swinscow, R. E. Symes-Thompson, L. R. S. Taylor, Raphael Taylor, G. T. G. Thomas, G. S. Thomas, J. H. Thomas, G. W. Thurlow, R. M. Todd, G. F. W. Tripp, R. B. Tulk-Hart, H. M. Upshon, R. D. G. Vann, Phyllis Vilain, Margaret R. Wade, D. H. G. Walker, M. M. Walker, R. B. Walker, H. A. Warbrick-Smith, A. S. Watson, H. B. Watson, Kathleen M. Watson, A. S. Watts, Arthur Waymouth, Arthur Webb-Jones, Mavis Westmoreland-White, R. O. Wheeler, D. O. Williams, J. O. D. Williams, O. S. Williams, R. A. Williams, R. E. O. Williams, R. B. N. Wilsdon, J. A. J. Wiseman, H. G. Wolskel, F. J. Y. Wood, D. G. Wraith, David Wynn-Williams, P. T. Yonge, A. M. A. Young, and K. D. Young.

Diplomas in anæsthetics, public health, psychological medicine, laryngology and otology were also conferred on the candidates named at the meetings of the Royal College of Surgeons reported in THE LANCET, June 22, p. 1146, and July 20, p. 88.

Diplomas were granted jointly with the Royal College of Surgeons to the following :—

D. T. M. & H.—C. M. Bowker.

D.M.R.—G. H. H. Woo.

D.O.M.S.—Violet M. Attenborough, K. R. Brown, Edward Epstein, S. S. Fotadar, G. H. Hair, M. S. Levis, Abraham Porter, G. E. Robinson, Mohamad Sarwar, J. G. Scott, and Dorothy K. Souper.

Royal College of Surgeons of England

A meeting of the council was held on July 25 with Mr. Hugh Lett, the president, in the chair. The Hallett prize was presented to Miss Audrey Smith (King's College, London).

The post of senior house-surgeon at the Essex County Hospital, Colchester, was recognised until July 31, 1942, for the six months' surgical practice required of candidates for the final examination for the fellowship.

Diplomas of membership were granted to those candidates mentioned in the Report published by the Royal College of Physicians.

Diplomas of fellowship were granted to J. A. Dunlop (St. Thos.) and U. M. Rao (Madras and St. Bart's). Diplomas of membership and diplomas in tropical medicine and hygiene, ophthalmic medicine and surgery and medical radiology were also granted to the candidates named above in the report of the meeting of the Royal College of Physicians. Licences in dental surgery were granted to the following :—

W. T. Athey, K. S. Bacon, E. R. Burt, Mary V. Dymond, Josephine Ells, S. F. Fish, J. H. Flitcroft, E. A. G. Hilton, Emanuel Hirschtritt, P. O. Holt, R. L. Hurst, P. E. Jeffery, Olive E. Knight, L. W. Ling, R. E. Matthews, N. M. Midgley, Alice Z. Mindel, I. H. J. Morgan, T. G. K. Penman, J. H. Ratcliffe, A. H. Reis, I. W. Ross, Gertrude M. Shalders, and R. B. D. Stocker.

Royal Appointments

The following have been appointed honorary surgeons to the King: Colonel F. F. S. Smith, I.M.S., in succession to Major-General E. W. C. Bradfield, I.M.S.; Colonel E. G. Kennedy, I.M.S., in succession to Colonel S. G. S. Haughton, I.M.S.; and Colonel R. H. Candy, I.M.S., in succession to Colonel W. E. R. Williams, I.M.S.

Wounded and Missing

The following casualties are reported in the Royal Army Medical Corps :—

Wounded.—Captain F. V. Allen, Lieutenant J. C. Heal, and Lieutenant S. L. Newman.

Missing believed prisoner of war.—Lieutenant A. G. Hewer, Lieutenant J. W. S. Irwin, Lieutenant A. L. Karstaedt, and A. Major P. H. Newman.

Missing.—Lieutenant (Qr.-Mr.) H. Baker, Major S. W. Barber, Captain J. Burns, Captain P. T. Cooper, Major Edward Davies-Thomas, Lieutenant D. A. Draffin, Lieutenant P. A. Forsyth, Lieutenant Edward Gartside, Lieutenant T. C. N. Gibbens, Lieutenant Isaac Jacobson, Lieutenant N. R. Lansdell, and Lieutenant C. K. McCoan.

CLAMPS FOR COMPOUND FRACTURES.—The clamp described by Mr. G. K. McKee in his article on page 38 of our issue of July 13 can be obtained from Messrs. Parish and Son, Pitt Street Ironworks, Pitt Street, Norwich.

Births, Marriages and Deaths

BIRTHS

AGAR.—On July 23, at Oxford, the wife of Dr. W. T. Agar—a daughter.

CAMPBELL.—On July 24, at West Town, near Bristol, the wife of Dr. A. H. Campbell—a daughter.

COUNIHAN.—On July 14, at Ennis, the wife of Lieutenant W. E. Counihan, R.A.M.C.—a daughter.

CUNLIFFE.—On July 24, at Watford, the wife of Dr. A. C. Cunliffe—a daughter.

PARSONS.—On July 23, at Cambridge, the wife of Dr. F. B. Parsons—a daughter.

TALBOT.—On July 28, at Ealing, the wife of Lieut.-Colonel Graeme Gibson Talbot, R.A.M.C. (T.)—twin sons.

TELLING.—On July 22, at Beckenham, the wife of Dr. Maxwell Telling—a daughter.

MARRIAGES

TIERNEY—HILL.—On July 20, in London, Patrick I. K. Tierney, M.B., to Zita Olive Hill.

DEATHS

ELMSLIE.—On July 24, at Tuesley, near Godalming, Reginald Cheyne Elmslie, O.B.E., M.S. Lond., F.R.C.S., aged 62 years.

IND.—On July 29, Charles Francis Ind, M.D. Durh., of Sittingbourne, Kent, aged 35 years.

MCGREGOR.—On July 24, at Harefield, Sanatorium, Middlesex, John Roy McGregor, M.B. Edin., D.P.H.

Obituary

REGINALD CHEYNE ELMSLIE

O.B.E., M.S. LOND., F.R.C.S.

Mr. R. C. Elmslie, who died on July 24 at Tuesley at the age of 62, was the son of Captain J. A. Elmslie, R.N.R. Through his great-grandfather, Dr. John Cheyne, who migrated from Scotland to Dublin, Elmslie was descended from three successive John Cheynes, who all practised surgery in Edinburgh. The eldest was a foundation fellow of the Royal College of Surgeons of Edinburgh and his portrait in full-bottomed wig, which hangs in Surgeons' Hall, could well be that of a brother of Elmslie.

Bereesford.

On leaving Brighton Grammar School Elmslie entered St. Bartholomew's Hospital at the age of 17. After a brilliant career as a student he qualified M.R.C.S. in 1901 and the following year obtained his M.B. In 1904 he was awarded the gold medal in the M.S. examination and became F.R.C.S. In 1905 he obtained the Jacksonian prize for his essay on the pathology and treatment of deformities of the long bones. At Bart's he had acted as house-surgeon to Sir Henry Butlin. He graduated to the staff from the pathology department, and after early promotion as a general surgeon was appointed in 1912 orthopædic surgeon to the hospital.

His appointment was an innovation, for till then the orthopædic department had been in charge of one of the assistant surgeons. Elmslie built up a department with a large outpatient section, an efficient massage and medical-gymnastics section and inpatient beds. He served his turn as chairman of the medical council at the hospital and was for some years treasurer to the medical college. When he retired he was appointed consulting orthopædic surgeon. He was also consulting surgeon to the National Orthopædic Hospital from which he had retired on his appointment to Bart's. During the last war he was surgeon to the Military Orthopædic Hospital at Shepherd's Bush and afterwards at Queen Mary's Hospital, Roehampton. Later he was appointed consulting surgeon to the Ministry of Pensions.

Elmslie was slow to form conclusions but once he had made up his mind he held firmly to his opinion, and he had opportunities of putting his views into practice which were denied to others, for he held many public positions. He took a great part in obtaining the charter for the Society of Massage and Medical Gymnastics and he was chairman of that body from 1929 to 1935. He was chairman of the executive committee of the Central Council for the Care of Cripples. He was a past president of the British Orthopædic Association and of the Medical Officers of Schools Association. He was on the council of the Royal College of Surgeons and during the last two years he had served as the only medical member of the Royal Commission on Workmen's Compensation. In spite of these important public contacts he remained shy and retiring and did not make friends easily. His conscientious work for the teaching and practice of orthopædics and for the problems connected with it left him little time for hobbies, but in later years he did some mild gardening at his country cottage. He leaves a wife and a son aged 20.

A colleague writes: Elmslie's reputation was built up by sheer merit and hard work. He was one of those who raised orthopædics from a rather minor branch to its present position in the field of surgery. His predecessors belonged to the old-fashioned school whose scope was limited to the treatment of deformities by instruments, exercises and minor surgical measures. Elmslie was one of the pioneers who changed all this. Orthopædic surgery deals so largely with mechanical processes that the

more difficult and underlying pathological problems are apt to be neglected. Not so with Elmslie. Although a first-rate surgeon he never regarded an operation as more than an incident in treatment, and his clinical judgment was second to none. It is a tribute to his teaching and example that so many of his house-surgeons at St. Bartholomew's have since played a great part in orthopædics. His orderly mind and gift of clear expression always commanded attention and respect at lectures, committees and clinical discussions. Orthopædic surgery has lost a great exponent whose skill and guidance can ill be spared.

H. J. S. adds: Even after retiring from a hospital Elmslie still regarded it with fatherly care. Two years ago he spent a week's holiday with the resident staff at the county branch of the Orthopædic Hospital—it was his own suggestion. He turned up on every ward round, he went to clinics, he watched operations and was persuaded to do one, he aired his views on every conceivable subject and kept his hosts up till midnight—to their very great profit, for his chief concern was the further development of orthopædic surgery and the welfare of a great hospital which he had seen grow out of a ramshackle country house.—And it was a disappointment when war broke out that Elmslie's health did not permit him to become clinical director of the Orthopædic Hospital at Stanmore as had been planned. No-one could have coördinated the work better and got more willing service out of his juniors, because those who knew him soon came to love him.

SAMSON GEORGE MOORE

M.D.MANC., M.R.C.P., D.P.H.

DR. S. G. MOORE, who died on July 15 at the age of 74 as the result of an accidental fall at his home in Huddersfield, was a native of Liverpool. He studied medicine at the university college there, taking his M.B.Vict. in 1890 and his M.D. in 1905. After acting for some years as assistant port medical officer he was in 1901 appointed medical officer of health of Huddersfield, a post which he held for 29 years. Dr. Moore's work for infant and maternal welfare won for him an international reputation, his outstanding achievement being the introduction of a system of notification of births in this country. The chairman of his health committee, Mr. Benjamin Broadbent, used to say: "If you are to try to save the lives of infants it is necessary to know that they are in being," and with his support Huddersfield in 1906 obtained a local act making the notification of births obligatory. A general optional act for the whole country was passed in the following year, and by 1915 had so justified itself that it was made compulsory. Dr. Moore believed whole-heartedly in keeping mother and child together, taking help to them in their own home, and for this purpose he instituted a system of health visiting carried out entirely by qualified medical women. By 1920 he was able to claim that infant mortality in Huddersfield had been reduced by about 30 %, and a few years later to assert that there was no child of school age in the city blinded by ophthalmia. Voluntary notification of pregnancy, which Dr. Moore desired to introduce, though less widely accepted was practised on a considerable scale in Huddersfield, and in the twelve years 1916–1928 the mortality amongst mothers who took advantage of the scheme was 2 per 1000 as compared with 6 per 1000 amongst those who did not. Dr. Moore was a vigorous supporter of the pasteurisation of milk and took that as the subject of a Chadwick lecture in 1923: he maintained that it was the duty of the medical profession "trusted by the people—and rightly trusted—to insist that a safe milk, and only a safe milk, be placed on sale."

Lafayette

One who worked with him for 16 years writes: Dr. Moore was a man of outstanding ability, original in thought and action. He devoted most of his life's work to the care and protection of mothers and children. His scheme for the voluntary notification of births in Huddersfield reduced the infant mortality by almost half in the first year of its application; so great was the success of this venture that the whole country soon followed suit. He was a stern but just man with the indomitable spirit and the inflexible will of the pioneer. I have much for which to thank him as teacher, master and friend.

CHARLES WILLMORE EMLYN

M.R.C.S.

Dr. Emlyn, who died on July 19, was a keen participant in the boy-scout movement from its early days. As a student at St. Bartholomew's in the 'nineties, he will be chiefly recalled for his interest in the old amateur dramatic club, of which he was for some years a leading spirit. After qualifying he practised for a few years in Bayswater, in partnership with the late Dr. Bruce. Early in the present century, however, he gave this up, and leaving London went to live a country life at Culworth. It was here, quite by chance, that he began to take a share, afterwards important, in the scout movement. In it, his delight in youth, and all that pertains to youth, Sir Arthur Hall writes, found a channel into which it flowed abundantly. His work for the movement, at first confined to the boys of his own village, soon grew, and in a short time he became a district commissioner for Northants. In 1914 he gave up his new home to join the R.A.M.C. for four years. After peace was concluded, he settled down at Boscombe. Here he renewed his scout activities, and continued them there to the end. He was not only active in connexion with the local movement but was sent by scout headquarters to promote the work all over the southern counties and the midlands. As a speaker at public meetings he was particularly effective. He ultimately became a chief scout's commissioner, and received the decoration of the Silver Fox. He was a man of untiring energy with talents of an exceptional and varied kind, peculiarly fitted to the work of this great national movement. With a delightful wit, coupled with a fluent and facile pen, he wrote "A Twenty-four Years' Hike" which Baden Powell describes in the foreword as "The most delightful book that I have seen on the scout movement." He also wrote simple plays which the boys could act themselves, and charming songs which are sung round many a camp fire.

DR. JAMES RUBIE, who died on July 28 at Sunbury, was a medical truant. He was born in Sydney in 1856 and came to England in a sailing ship by way of Cape Horn to study medicine in London and Dublin, and he qualified L.R.C.P.E. in 1883. A period of medical work at Greenwich and Poplar followed but Rubie soon gave up medicine for journalism and became a member of the staff of the *Evening News*. For a time he worked in Paris as assistant editor of *Galignani's Messenger*, and in 1909 his work for the *Times* began. He became a member of the staff in 1919 and only retired in 1933.

Infectious Disease in England and Wales

DURING THE WEEK ENDED JULY 13, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1262; whooping-cough, 738; diphtheria, 726; enteric fever, 94; measles (excluding rubella), 9082; pneumonia (primary or influenzal), 457; puerperal pyrexia, 134; cerebrospinal fever, 184; poliomyelitis, 26; polio-encephalitis, 4; encephalitis lethargica, 3; dysentery, 15; ophthalmia neonatorum, 90. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on July 12 was 622, made up of: scarlet fever, 118; diphtheria, 103; measles, 18; whooping-cough, 16; enteritis, 50; chicken-pox, 21; erysipelas, 23; mumps, 22; poliomyelitis, 1; dysentery, 1; cerebrospinal fever, 30; puerperal sepsis, 32; enteric fevers, 51; german measles, 4; other diseases (non-infectious), 53; not yet diagnosed, 79.

Deaths.—In 126 great towns, including London, there was no death from smallpox, enteric fever, or scarlet fever, 3 (0) from whooping-cough, 4 (1) from measles, 23 (1) from diphtheria, 27 (5) from diarrhœa and enteritis under 2 years, and 8 (0) from influenza. The figures in parentheses are those for London itself.

Liverpool and Plymouth each reported 3 deaths from diphtheria. There were 4 deaths from diarrhœa at Birmingham.

Notes, Comments and Abstracts

CATARACT AMONG THE ANCIENTS

IN an ambitious review of the treatment of cataract from early times D. D. Sathaye tells us (*Ind. J. Ophthal.* April, 1940, p. 32) that in China needling of cataracts was done at the time of the Huang T dynasty (2279 B.C.). In India, the recognition and surgical treatment of cataract are as old as medical science itself. Eight of the hundred and ten columns of the Ebers Papyrus are devoted to ophthalmology, and for "dimness of sight" (a comprehensive diagnosis which included cataract) treatment with swamp water or with honey mixed with the excrement of a child is recommended. The ophthalmology of Hippocrates was a trifle shaky but Celsus devised an operation for cataract, which he thought lay in an empty space between the chrystalloides ("a drop of humour resembling the white of an egg from which proceeds the faculty of vision") and the iris. Galen threw much fresh light on the anatomy of the eye, but less on the physiology or pathology of that organ. Like Hippocrates, he believed that cataract was due to "catarrh descending from the brain to the eyes," a statement that reads strangely like a modern advertisement for a proprietary remedy. About 1000 B.C. Sashruta in India laid down detailed rules of procedure for dealing with cataracts. Thus, only such cataracts supposed to be caused by some derangement of the humour called Kafa or Shlesma were suitable for operation. It would be interesting to know on what grounds these were clinically differentiated from other types of cataract. He also attached importance to the general condition of the patient. Nervous people, those suffering from severe pain in the head, eyes, or ear, and those unfit for bleeding or suffering from indigestion were bad operative risks. Operation was not to be undertaken in very hot or very cold weather, and, as a preparation, the patient was to be given first oily substances and then a bath to make him sweat. He was made to sit upright in front of the surgeon, held firmly in position, and made to look fixedly at the tip of his own nose. The operation was done with a double-tapered instrument called a shalaka, made of copper, steel or gold, and eight finger-breadths long. Ambidexterity was demanded of the surgeon, for he was expected to operate on the left eye with the right hand and the right eye with the left. The technique of the operation involved puncturing a selected spot on the outer side of the white of the globe. If properly done the puncture would cause a watery drop to appear "and there would be a sound." The spot was next washed with human milk and the area of the cataract was then scratched away with the sharp end of the shalaka. The patient was finally made to close the opposite nostril and sneeze out the cataractous lens. "If the scratching is properly done the pupil shines like the sun free from clouds and is free from pain." What could be better? After treatment the eye was washed and bandaged and the patient was kept supine for ten days. For over two thousand years "couching" of the lens, as it was called, was the only operation performed for cataract.

BEWARE OF THE MACHINE

WHEN the inhabitants of Erewhon consigned machinery to the museum they probably had the right idea; but we live in a less civilised community and machines mean both life and death to us. It is one thing to be killed by an engine of war and quite another to get tangled up in the engines of industry; in one case you are doing your best, in the other you are being a nuisance, and that, just now, is unforgivable. With thousands of inexperienced workers being drafted into factories the accident-rate is bound to increase for a time, but common sense and a regard for rules can help to keep it down. The National Safety First Association, of 52, Grosvenor Gardens, S.W.1, has published a small green booklet called "We don't want to lose you" which, in sixteen pages, largely occupied by the droll cautionary drawings of Mendoza, warns the worker against common factory dangers. There are not many rules: keep your eyes open for traffic, stand from under, handle your tools properly, keep the gangways clear, wear a cap to keep your hair out of danger, learn to stop your machine before you start, ask when in doubt, respect guarded machinery for your own sake, don't attempt practical jokes, wear the protective clothing provided, and get first-aid treatment for all injuries. They are set out memorably and amusingly, and old as well as new workers might do worse than carry the booklet in their overall pocket. It can be obtained from the association for 3*d.*, post-paid, or at a reduced price for quantities.

BLOOD BY ROAD

THE Australian Red Cross Society has given a mobile blood-transfusion unit for the use of the 2nd A.I.F. overseas. It is a well-sprung lorry specially designed to carry a blood-bank, refrigerator, autoclave and blood-transfusion outfit. Blood can be collected at leisure behind the lines in a peaceful area, and sent quickly forward to the front as it is needed. Sovulac collecting flasks each containing 1 litre are used in the unit; they are filled completely, and covered with a metal protector. Shaking is thus minimised and hæmolysis reduced. The flasks are packed in rubber-lined metal trays and carried at the sides of the lorry in ice chests, which are maintained by a refrigerating plant at 2°–6° C. Each chest carries ten flasks, and a complete chest can be removed by two men in three minutes and left at any point of the journey, ready for use. The flasks are labelled with the donor's names, the dates of collection and the blood-groups; and every member of the 2nd A.I.F. has had his blood-group recorded before embarkation from Australia.

BRITISH THUNDERSTORM SURVEY

Dr. F. R. Humphreys, who appealed last year on behalf of the survey for help in collecting particulars of personal injuries caused by lightning or electric current, writes: "Owing to war conditions the public press is supplying little information, but lightning still strikes, and the problems connected with it are important. For example, fracture of the skull by direct impact without any burns seems to be not uncommon.

"I should be glad if your readers would furnish me with information about any cases that come to their knowledge—especially those where a post-mortem is held and not merely the customary inspection with the aid of a local policeman. I may add that artificial respiration and its use in cases of unconsciousness supposed to be due to lightning is quite rare." Dr. Humphreys may be addressed at 15, Denton Road, Wokingham, Berks.

SCOTTISH NEUROPATHOLOGICAL LABORATORY SERVICE.—The board of the Scottish Mental Hospitals' Pathological Scheme intends to continue the work of the laboratory as far as is possible in war-time, though it may not prove possible to maintain the laboratory staff at full peace-time strength. Normal facilities may have to be restricted but a new field is likely to develop in the investigation of head and brain injuries. Prof. A. Murray Drennan, the director, holds that questions will arise which the laboratory can help to answer, and he feels that it should be kept in being for this if for nothing else.

Appointments

BENHAM, LALAGE R., M.B. Melb., D.P.H., assistant welfare M.O. for Durham.

BERRINGTON, W. P., M.D. Belf., D.P.M., temporary first assistant M.O. in The L.C.C. mental health service at an emergency hospital.

CAMPBELL, W. C., L.M.S.S.A., temporary assistant M.O.H. for Wolverhampton.

COLES, JOHN, M.B. Sydney, R.S.O. at Ingham Infirmary, South Shields.

COX, GLADYS M., M.B. Lond., assistant welfare M.O. for Durham.

CRONIN, J. D., M.B. Lond., R.S.O. at Grimsby and District Hospital.

EBAN, ISAAC, M.B. Belf., D.M.R.E., temporary director of radiological department, Queen Mary's Hospital for the East End.

FIRMIN, DOREEN P., M.B. Camb., M.R.C.P., D.P.M., temporary specialist in the L.C.C. mental health service at an emergency hospital.

GRAY, JOHN, M.D., M.Chir. Camb., F.R.C.S., F.A.C.S., hon. assistant surgeon to the Derby Royal Infirmary.

KERBY, T. R. F., M.R.C.S., D.M.R.E., assistant radiologist at the Royal Berkshire Hospital, Reading.

SCOTT, MARGARET J., M.B. Camb., resident registrar in the surgical O.P. department of Royal Infirmary, Manchester.

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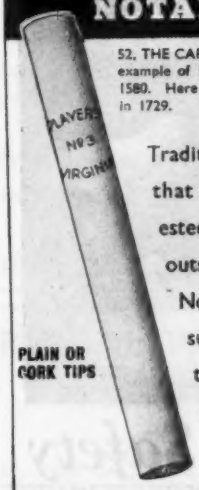

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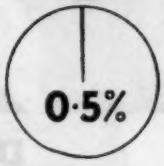

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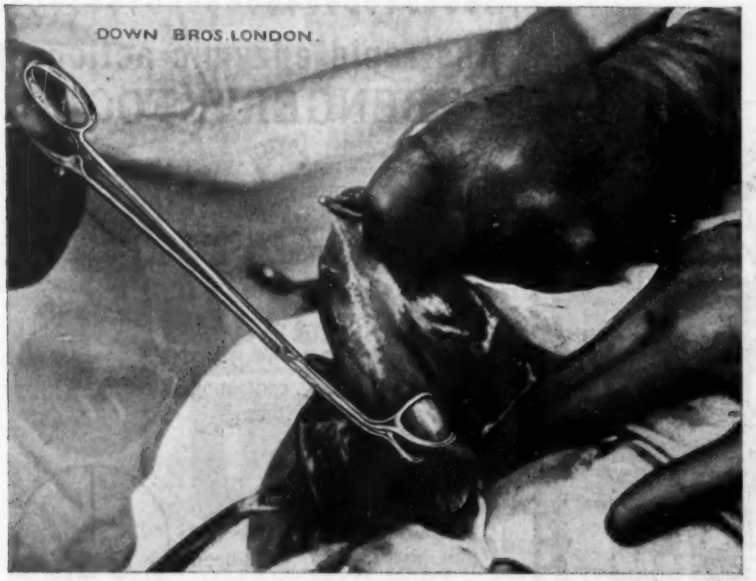

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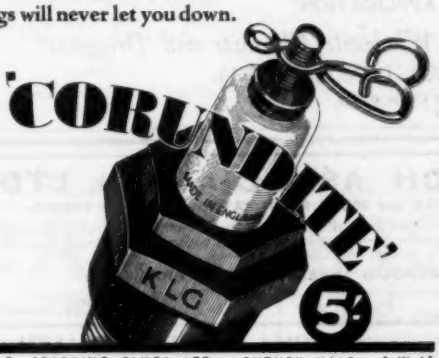

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WAR SURGERY OF THE ABDOMEN. 5th–9th August, 1940.

MONDAY, 5TH AUGUST.		
10 a.m.	Introduction.	Sir Cuthbert Wallace, K.C.M.G., C.B., LL.D., F.R.C.S.
11.15 a.m.	Types of Abdominal Wounds and their Pathological Consequences.	Mr. V. Zachary Cope, M.D., M.S., F.R.C.S.
12.15 p.m.	Instruments and Appliances for Abdominal Surgery.	Mr. R. H. Franklin, M.B., B.S., F.R.C.S.
2 p.m.	Cadaver Demonstrations.	Mr. A. K. Henry, M.Ch., F.R.C.S.
TUESDAY, 6TH AUGUST.		
10 a.m.	Gunshot Wounds in the Field.	
11.15 a.m.	Technique of Operation for Abdominal Wounds.	Surg. Rear Admiral G. Gordon-Taylor, O.B.E., M.S., F.R.C.S.
1.15 p.m.	Bus to Royal College of Surgeons.	
2 p.m.	Demonstration of Specimens in War Collection at College.	Mr. R. T. Payne, M.D., M.S., F.R.C.S.
WEDNESDAY, 7TH AUGUST.		
10 a.m.	Wounds of Solid Viscera.	Professor G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S., F.A.C.S., F.R.A.C.S.
11.15 a.m.	Abdomino-thoracic Wounds.	Major A. L. D'Abreu, M.Ch., F.R.C.S.
12.30 p.m.	X-ray Demonstrations.	Dr. J. Duncan White, M.B., Ch.B., D.M.R.E.
2 p.m.	After-treatment of Abdominal Wounds and Immediate Complications.	Mr. D. M. Douglas, M.S., F.R.C.S.
3 p.m.	Some Late Complications and Sequelæ.	Mr. W. H. Ogilvie, M.D., M.Ch., F.R.C.S., F.A.C.S.
THURSDAY, 8TH AUGUST.		
10 a.m.	Gunshot Wounds of Bladder & Pelvis.	
11.15 a.m.	Gunshot Wounds of Kidney & Ureter.	
12.30 p.m.	X-ray Demonstrations.	Dr. J. Duncan White, M.B., Ch.B., D.M.R.E.
2 p.m.	Gunshot Wounds of Urethra, etc.	Mr. Clifford Morson, O.B.E., F.R.C.S.
3.15 p.m.	Gunshot Wounds of External Genitalia.	Mr. Clifford Morson, O.B.E., F.R.C.S.
FRIDAY, 9TH AUGUST.		
10 a.m.	Gunshot Wounds of Rectum and Large Bowel.	Sir Charles Gordon-Watson, O.B.E., M.S., F.R.C.S., F.R.A.C.S.
11.15 a.m.	Complications of Gunshot Wounds of Rectum and Large Bowel.	Mr. A. L. Abel, M.S., F.R.C.S.
12.30 p.m.	Anæsthesia.	Dr. H. Woodfield Davies, B.A., L.M.S.S.A.
2 p.m.	Some Notes on Casualties recently seen in the Field.	Colonel P. H. Mitchiner, C.B.E., M.S., F.R.C.S.

The fee for the Course will be £1 1s., but no fee will be charged in the case of Officers of the Armed Forces who submit a leave certificate and register their names before the commencement of the Course. Applications for tickets should be addressed to the Dean, British Postgraduate Medical School, Ducane Road, W.12. Further Courses of War Surgery will commence as follows:—War Surgery of the Extremities: Monday, August 19th, 1940. Operative Surgery in Wartime, including Cadaver Surgery: Tuesday, August 27th, 1940.

Stations: Wood Lane (Central London Railway), Ladbroke Grove (Metropolitan Railway) and No. 7 (Acton Vale) Bus.

Buses: No. 7 (Acton Vale), Nos. 72 and 105 to Bloemfontein Road, Westway. **Trolley-buses:** Nos. 628 and 630.

CAVENDISH NURSES

Special Nurses for Nerve and Mental Cases.

MALE and FEMALE

A very convenient form of telephone message pad sent free on application to the Secretary.

Head Office: 54, BEAUMONT ST., LONDON, W.1 (late 43, New Cavendish St., London, W.1).

Branches:—MANCHESTER: 176, *Oxford Road.* *GLASGOW:* 28, *Windsor Terrace.* *DUBLIN:* 23, *Upper Baggott Street.*

Superior trained Nurses for Medical, Surgical, Mental Dipsomania, Travelling and all cases. Nurses reside on the premises and are always ready for urgent calls Day and Night. Skilled Masseuses, Masseurs, and good Valet attendants supplied. *Terms from £3 13 6. Apply to the Secretary or Lady Supt.*

Telegrams: Tactear, London. :: Surgical, Glasgow. Tactear, Manchester. :: Tactear, Dublin.

Telephones: London, 1277 Welbeck (2 lines). Manchester, 3152 Ardwick. Glasgow, 477 Douglas Dublin, 62086.

Telephone: WELbeck 2728 Telegrams: "ASSISTIAMO, LONDON"

For MEDICAL, SURGICAL, and

MENTAL NURSES

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THE NURSES' ASSOCIATION

In conjunction with the MALE NURSES' ASSN.

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Mrs. MILLICENT HICKS, *Superintendent* W. J. HICKS, *Secretary*

THE MAGHULL HOMES FOR EPILEPTICS (INC.)

MAGHULL (Near Liverpool)

FARMING and OPEN AIR OCCUPATION for PATIENTS

A few vacancies in 1st and 2nd Class Houses.

FEES:

1st Class (men only) from £5 5s. p.w. upwards.

2nd Class (men and women) 32/- p.w.

For further particulars apply Secretary,

C. EDGAR GRISEWOOD, A.C.A., 20 Exchange St. East, Liverpool

MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

FENSTANTON, at "FIVE DIAMONDS," Chalfont St. Giles, Bucks.

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (*See Medical Directory*, p. 2346.) Apply Resident Physician. Telephone: Little Chalfont 2048. Station: Chalfont and Latimer.

THE GROVE HOUSE,

CHURCH STRETTON, SHROPSHIRE.

Private Home for Ladies mentally ill. Voluntary and Temporary Patients received.

Medical Superintendent: Dr. J. A. MCCLINTOCK.

CITY OF LONDON MENTAL HOSPITAL

Near DARTFORD, KENT.

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards.

HEIGHAM HALL, NORWICH

PRIVATE MENTAL HOME for Nervous and Mental illness. All forms of treatment available. Fees from 4 gns. per week upwards, according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.

Apply to Dr. J. A. SMALL. Telephone: Norwich 80.

PORTSMOUTH CITY MENTAL HOSPITAL

Accommodation is provided for the reception of PRIVATE PATIENTS of both sexes in three detached Villas, which are healthily and pleasantly situated in extensive grounds with sea views.

Charges from 3 guineas weekly, including all necessaries except clothing.—Apply to the Medical Superintendent and Resident Physician, THOMAS BEATON, O.B.E., M.D., F.R.C.P.

THE RETREAT, YORK

The Pioneer Hospital, opened 1796, for the humane treatment of those suffering from Nervous and Mental Disorder

This Hospital of 200 beds, administered by a Committee of the Society of Friends, combines what is best in the investigation and treatment of nervous illness with a sympathetic and friendly atmosphere. Last year 118 patients were admitted, of whom 84 were voluntary cases.

Much curative work is accomplished in our mental hospitals to-day and the recovery rate compares very favourably with that of our general hospitals.

For information and terms of admission apply to:—
The Physician Superintendent,
ARTHUR POOL, M.R.C.P.
(Telephone: York 3612)
who is available for consultation

MUNDESLEY SANATORIUM

has migrated from Norfolk to

VALE ROYAL ABBEY, Winsford, Cheshire

Resident Physicians:
S. VERE PEARSON, M.D. (Cantab.), M.R.C.P. (Lond.).
E. C. WYNNE-EDWARDS, M.B. (Cantab.), F.R.C.S. (Edin.).
GEORGE H. DAY, M.D. (Cantab.).

TERMS FROM 8 GUINEAS WEEKLY Telephone: WINSFORD 3336

HAYDOCK LODGE,

NEWTON-LE-WILLOWS, LANCASHIRE.

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *'Phone:* Ashton-in-Makerfield 7311. *Tele. Address:* Street, Ashton-in-Makerfield.

THE LAW NURSING HOME

ROCHDALE (Lancs)

Founder: The late SIR A. J. LAW, J.P., M.P.

A Private Hospital, exclusively for the treatment of POST-ENCEPHALITIC PARKINSONISM, PARKINSON'S DISEASE and ALLIED DISORDERS

The Nursing Home is governed by Trustees; any surplus is utilized to help patients who cannot afford full fees. Extensive grounds. Hydro. Expert Massage and Physical re-education. Dietary treatment. Equipped with every laboratory apparatus for the investigation and treatment of the diseases. Results of the BULGARIAN TREATMENT published (*Lancet*, 1939, 1, 693) approx.: 300 patients treated in the last 3 years. Terms moderate. Further particulars apply Medical Superintendent. Tel.: Rochdale 2960.

RUTHIN CASTLE, NORTH WALES

A Private Clinic, the first in Great Britain, for investigation and treatment of all forms of disease, except infectious and mental

There is a steel and concrete Air Raid Shelter with heating and a lift to all floors

Inclusive charges Apply SECRETARY Telephone: Ruthin 66

COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 20 acres, 1100 ft. up for bracing moorland air.

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P.

Telephones—STARCROSS 259 and TEIGNMOUTH 289

ST. ANDREW'S HOSPITAL

FOR NERVOUS AND MENTAL DISORDERS, NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., M.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet courses, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

CHEADLE ROYAL HOSPITAL, Cheadle, Cheshire.

This REGISTERED HOSPITAL, with a SEASIDE BRANCH at Colwyn Bay, N. Wales, is for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL AND NERVOUS DISEASES.

The Hospital is governed by a COMMITTEE, appointed by the TRUSTEES of the Manchester Royal Infirmary.

In addition to the Main Buildings there are separate villas. Extensive grounds. Hard and grass tennis courts, cricket and croquet grounds, and a court for badminton. There are also wireless installations. Golf may be had within easy distance. Occupational Therapy.

VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS received.

The Hospital is nine miles from Manchester, 50 minutes by rail from Liverpool, and 3½ hours from London.

For terms and further particulars apply to the Medical Superintendent, who may be seen in Manchester BY APPOINTMENT. *Telephone: Gatley* 2231 (3 lines).

CAMBERWELL HOUSE

Telegrams: "PSYCHOLIA, LONDON." **33, PECKHAM RD., LONDON, S.E.5.** Telephone: Rodney 4242 (2 lines).

For the treatment of MENTAL DISORDERS.

Also completely detached Villas for Mild Cases, with private suites if desired. Voluntary Patients received. Twenty acres of Grounds. Hard and Grass Tennis Courts, Putting Greens, Bowls, Croquet, Squash Rackets, Recreation Hall with Badminton Court, and all indoor amusements, including Wireless and other Concerts, Occupational Therapy, Calisthenics, and Dancing Classes. X-ray and Actino-therapy, Prolonged Immersion Baths, Operating Theatre, Pathological Laboratory, Dental Surgery, and Ophthalmic Department. Chapel. **Shock and also modified Insulin Therapy.**

Senior Physician: Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff, and visiting Consultants.

An Illustrated Prospectus, giving fees which are strictly moderate, may be obtained upon application to the Secretary.

The Convalescent Branch is Hove Villa, Brighton, and is 200 feet above sea level.

THE COTSWOLD SANATORIUM

First opened in 1898 and rebuilt in 1925 on the Cotswold Hills seven miles from Cheltenham, for the Treatment of Pulmonary and all other forms of Tuberculosis. Aspect S.S.W., sheltered from North and East, elevation 800 feet. Pure bracing air, SPECIAL TREATMENT by artificial PNEUMOTHORAX (X-ray controlled). TUBERCULINS, and ULTRA-VIOLET RAYS is available when necessary without extra charge. X-RAY plant, Fully Equipped Dental Department, Electric Light Radiators, hot and cold basins and Wireless in all rooms. Up-to-date drainage. Full day & night Nursing Staff. **Terms: 5 to 7½ Guineas a week inclusive.**

Med. Supt.: GEOFFREY A. HOFFMAN, B.A., M.B., T.C. Dub. *Asst. Phys.:* MARGARET A. HARRISON, M.B., B.S. Lond. *Cons. Laryngologist:* G. N. BARKER, F.R.C.S. Edin., D.L.O. *Cons. Dent. Surgeon:* GEORGE V. SAUNDERS, L.D.S.R.C.S. Lond. *Phone:* 81 & 82 Witcombe. Apply: *The Secretary, The Cotswold Sanatorium, Cranham, Gloucester. Telegrams:* "Hoffman, Birdlip."

PRIOR PLACE SANATORIUM

HEATHERSIDE, CAMBERLEY, SURREY.

FOR THE TREATMENT OF PULMONARY TUBERCULOSIS

Well situated on high ground and surrounded by pines and heather.
All rooms are fitted with electric light, wash basins with hot and cold water, and radiators.
X ray plant. Day and night nursing staff.

RESIDENT MEDICAL SUPERINTENDENT: Dr. H. O. BLANFORD, to whom application for admission can be made.

THE OLD MANOR SALISBURY

A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS.

Extensive grounds. Detached Villas. Chapel. Garden and Dairy Produce from own farm. Terms very moderate.
CONVALESCENT HOME AT BOURNEMOUTH Detached Villas standing in 12 acres of ornamental grounds, with tennis courts, etc., which Voluntary, Temporary or Certified Patients may visit by arrangement for long or short period.
Illustrated Brochure on application to the Medical Superintendent. The Old Manor, Salisbury. Telephone: Salisbury 3216 and 3217.

VALE OF CLWYD SANATORIUM

This Sanatorium is established for the treatment of Tuberculosis of the Lungs and the Pleural Cavities. It is situated in the midst of a large area of park-land at a height of 450 feet above sea-level, on the South West slopes of mountains rising to over 1800 feet, which protect it from north and east winds and provide many miles of graduated walks with magnificent views. Average rainfall 29·57 per annum. Full day and night Nursing Staffs. X-Ray plant. Every facility for Artificial Pneumothorax and for operations on the chest. Electric Lighting. Central Heating. Home Farm. Grade A Milk from T.T. Herd.
For particulars apply to Medical Superintendent.
H. MORRESTON DAVIES, M.D., M.Ch. (Cantab.), F.R.C.S., Llanbedr Hall, Ruthin, N. Wales.

HOLLOWAY SANATORIUM VIRGINIA WATER

A Registered Hospital for the Treatment of MENTAL DISORDERS of the EDUCATED CLASSES. Founded by THOMAS HOLLOWAY in 1885.

This Institution is situated in a beautiful and healthy locality within easy reach of London. It is fitted with every comfort. Patients can have Private Bedrooms and Special Nurses as well as the use of General Sitting Rooms, at moderate rates of payment. Voluntary Patients can be admitted.

There is a Branch Establishment at CANFORD CLIFFS, BOURNEMOUTH, where Patients can be sent for a change and be provided with all the comforts of a well-appointed home.

For Terms, apply to—
The RESIDENT MEDICAL SUPERINTENDENT, St. Ann's Heath, Virginia Water, SURREY

SPRINGFIELD HOUSE

'Phone: BEDFORD 3417. **Near BEDFORD**
For Mental Cases with or without Certificates.
Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).
For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.
INTERVIEWS IN LONDON BY APPOINTMENT.

STRETTON HOUSE,

Church Stretton, Shropshire.
ESTABLISHED IN 1853.
A PRIVATE HOME for the treatment of gentlemen suffering from Mental and Nervous illness, including the allied Disorders of Alcoholism and the Drug Habit. All types of early Mental and Nervous Cases are received without Certificates as Voluntary Patients under the provisions of the Mental Treatment Act, 1930 Bracing hill country. See "Medical Directory," p. 2358.—Apply to the Medical Superintendent. 'Phone 10 P.O., Church Stretton

THE ARCHER NERVE TRAINING COLONY LANGLEY RISE, KING'S LANGLEY, HERTS.

Reduced fee period for any fortnight during the summer months, to give tired but upstanding people an opportunity to learn methods of Systematic Relaxation and how to achieve real rest.
Reception area. Official Air Raid Shelters installed.
Apply SECRETARY. *Tel.: King's Langley 7519.*

BROOKE HOUSE, CLAPTON

A PRIVATE HOME for the treatment of Nervous and Mental Disorders in both sexes. Situated in nine acres of Pleasure Grounds.
Voluntary, Temporary, and Certified Patients received.
For further particulars apply—
Dr. ERNEST ROLLINS, Resident Physician.
Tel.: Amherst 1642.

ALCOHOLISM

Drug Habits, and Nervous Disorders

25 minutes from London, situated in charming grounds and country, is a "home from home" for those seeking rest and treatment under medical supervision. Fees from 6 guineas. Illustrated brochure on application to the matron.

CHISLEHURST 451

OLD HILL HOUSE
CHISLEHURST, KENT.

THE COPPICE, NOTTINGHAM.

HOSPITAL FOR MENTAL DISEASES.
President: The Right Hon. LORD BELPER.

This Institution is exclusively for the reception of a limited number of PRIVATE PATIENTS of both sexes, of the UPPER and MIDDLE CLASSES, at moderate rates of payment. It is beautifully situated in its own grounds, on an eminence a short distance from Nottingham, and commands an extensive view of the surrounding country; and from its singularly healthy position and comfortable arrangements affords every facility for the relief and cure of those mentally afflicted. Voluntary and Temporary Patients received. Occupational Therapy. For terms, &c., apply to the Medical Superintendent.
Telephone: 64117 Nottingham.

UNIVERSITY EXAMINATION POSTAL INSTITUTION

17, RED LION SQUARE, LONDON, W.C.1

Over 50 years' experience

POSTAL AND ORAL COACHING FOR ALL MEDICAL EXAMINATIONS

MEDICAL PROSPECTUS (36 pages), sent gratis, along with List of Tutors, &c., on application to the Principal, 17, Red Lion-square, London, W.C.1. (Telephone: HOLborn 6313.)

Hampstead General Hospital,

Haverstock-hill, N.W.3.

Applications are invited from Single Medical Men for the post of HOUSE SURGEON (B2) for six months, vacant 1st September next. Salary £133 6s. 8d. per annum.

Applications on the prescribed form, with copies of three testimonials, to be returned 24th August.

KENNETH A. F. MILES, Secretary.

Hampstead General Hospital,

Haverstock-hill, N.W.3.

OUT-PATIENT DEPARTMENT—CAMDEN TOWN, N.W.1.

Applications are invited from registered Single Medical Women for the resident appointment of CASUALTY SURGICAL OFFICER for six months, vacant 1st September next, at the Out-patient Department, Camden Town. Salary £100 per annum, plus an allowance of £50 per annum for duties in connexion with the First-aid Post established there.

Applications on the prescribed form, with copies of three testimonials, to be returned by 24th August.

KENNETH A. F. MILES, Secretary.

British Postgraduate Medical School.

(UNIVERSITY OF LONDON.)

There is a vacancy for an ASSISTANT with special experience in Bacteriology in the DEPARTMENT OF PATHOLOGY.

The selected candidate will be required to work in the Bacteriological section under the direction of the Professor of Pathology. His duties will include routine clinical bacteriology, research, and teaching.

The appointment will be for the duration of the war but may be terminated earlier by three months' notice. The salary will be at the rate of £400 per annum. The successful candidate may join the Federated Superannuation System for Universities.

Applications accompanied by copies of testimonials and the names of two referees, should be sent to the Dean, British Postgraduate Medical School, Ducane-road, London, W.12, from whom further particulars may be obtained. They should arrive not later than 16th August, 1940.

Bolingbroke Hospital, Wandsworth

Common S.W.11.

Applications are invited from registered Medical Practitioners (Male) for the appointment of CASUALTY OFFICER (A) to become vacant on September 1st, including R Practitioners within three months of qualification. If held by an R Practitioner appointment will be for a period of six months, otherwise reappointment for a further period will be considered. Salary is at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications, with dates and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 12th August, 1940.

W. S. RANDOLPH-BISS, Secretary-Superintendent.

Royal National Orthopædic Hospital.

Applications are invited from registered Medical Practitioners (Male) for the appointment of RESIDENT HOUSE SURGEON (B2) at the Royal National Orthopædic Hospital, Great Portland-street, W.1. Salary £200 per annum, with board, quarters, laundry, &c. Duties to commence September 1st. Six months' appointment.

Applications, stating age, nationality, qualifications, and previous experience, with copies of testimonials, should be sent to the Secretary, 234, Great Portland-street, W.1, not later than August 15th.

The Willesden General Hospital,

Harlesden Road, N.W.10.

Applications are invited for the appointment of HONORARY CLINICAL ASSISTANT to the Medical Out-patient Session, held on Friday mornings.

Applications should be forwarded to the Secretary, from whom further details of the appointments may be obtained, and should be received not later than 14th August, 1940.

London County Council.

Registered Medical Practitioners, Male and Female, required as HOUSE SURGEONS/PHYSICIANS (A) in the Council's general and special hospitals, including R Practitioners within three months of qualification. If held by an R Practitioner, appointment for period of six months. Otherwise for six-monthly periods to maximum of two years.

Salary £120, with full residential emoluments.

Application forms obtainable (stamped addressed foolscap envelope necessary) from Medical Officer of Health, Staff Division 2, County Hall, S.E.1, to be returned forthwith. Canvassing disqualifies.

Queen's Hospital for Children,

Hackney-road, E.2.

CASUALTY OFFICER (A) required 1st September, 1940.
HOUSE PHYSICIAN (B2) required 15th September, 1940.

Six months' appointments. Salary at rate of £100 per annum, with board, lodging, and laundry in each case. Candidates must be prepared to participate in the emergency hospital arrangements in connexion with which beds have been reserved and in respect of which additional remuneration is payable.

Applications must be made on forms to be obtained from the undersigned and be sent in, with copies of not more than three testimonials, on or before the 22nd of August.

CHARLES H. BESSELL, Secretary.

The Hostel of St. Luke

(The Clergy Nursing Home)
14, Fitzroy-square, London, W.1.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B2).

Applications are invited from registered Medical Practitioners (Male or Female), British nationality, for the appointment of Resident Medical Officer (B2), including R Practitioners who hold A Posts and who have not completed five months' tenure of those posts. If held by an R Practitioner, the appointment will be limited to six months, otherwise it will be for a period of six months and may be renewable for a further period of six months. The salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications, with dates, nationality and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

J. A. CAMPBELL, Capt. R.N. Retd., Secretary.

County Borough of Croydon.

PUBLIC HEALTH DEPARTMENT.

RESIDENT ASSISTANT MEDICAL OFFICER (B1), MAYDAY HOSPITAL.

Applications are invited for this post from registered Medical Practitioners of either sex. Candidates must have had practical hospital experience in Gynæcology and Obstetrics, and of ante- and post-natal clinics. Suitably qualified R Practitioners holding B2 or B1 appointments are invited to apply. The appointment will be for twelve months. Salary £300 per annum, with board-residence at the hospital and laundry valued at £140.

The officer appointed will be on the staff of the Medical Officer of Health and work under his administrative supervision.

Application forms may be obtained from the Medical Officer of Health, on receipt of a stamped addressed foolscap envelope, and should be returned to him not later than 11 a.m., Monday, 12th August, 1940, together with copies of three testimonials of recent date. Canvassing will disqualify.

E. TABERNER, Town Clerk.

Town Hall, Croydon, 27th July, 1940.

Ancoats Hospital, Manchester, 4.

APPOINTMENT OF RESIDENT CASUALTY OFFICER (B1).

Applications are invited from registered Medical Practitioners for the appointment of Resident Casualty Officer to become vacant on September 14th. Applicants should have held house appointments and those with the primary fellowship diploma preferred. The successful candidate will deputise for the Resident Surgical Officer at alternate week-ends and other scheduled times. Salary £150 per annum, with board, lodging, laundry, &c. Appointment for six months.

Applications, stating age, qualifications, nationality, and past experience, to be forwarded to the undersigned on or before Wednesday, 21st August, together with copies of three recent testimonials.

HERBERT J. DAFFORNE,
General Superintendent and Secretary.

Warrington Infirmary & Dispensary.

CLINICAL ASSISTANT (EYE DEPT.).
(Non-Resident).

Applications are invited for the above post, and should be sent in not later than Saturday, 24th August.

Salary £150 per annum.

Particulars of duties can be obtained from the undersigned.

HENRY L. BOOT,
1st August, 1940. Superintendent and Secretary.

Essex County Hospital, Colchester.

WANTED ASSISTANT HOUSE SURGEON (A).

Appointment for six months from mid-August. Salary £120 per annum, with board, residence, and laundry.

Applications, with copies of three testimonials, to reach the Secretary by Friday, 9th August.

County Borough of Dewsbury.

DEPUTY MEDICAL OFFICER OF HEALTH.

Applications are invited from qualified and registered Medical Practitioners for the post of Deputy Medical Officer of Health. Experience in Infectious Diseases and Tuberculosis is essential.

The salary is £650 per annum, rising by £25 to £700, and a car allowance of £50 per annum. The appointment will be subject to the provisions of the Local Government and Other Officers' Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Particulars of the duties, and terms and conditions of the appointment, together with application forms, may be obtained from Dr. J. F. Galloway, Medical Officer of Health, Municipal Buildings, Halifax-road, Dewsbury, to whom applications, accompanied by copies of not more than three recent testimonials, should be delivered not later than Monday, 12th August, 1940.

Canvassing in any form will be a disqualification.

HOLLAND BOOTH, Town Clerk.

Town Hall, Dewsbury, 20th July, 1940.

Horton General Eye Hospital, Banbury, OXON.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B2)

Applications are invited from registered Medical Practitioners, Male or Female.

Appointment becomes vacant on 21st August, 1940. The appointment is limited to 6 months. Salary at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality and present post (if any) accompanied by copies of 3 recent testimonials, should be sent to the undersigned not later than Monday, 5th August, 1940.

RICHARD H. PRESCOTT,
Secretary and House Governor.

Salisbury General Infirmary.

(Voluntary Hospital—225 Beds.)

APPOINTMENT OF HOUSE SURGEON (A).

Applications are invited from registered Medical Practitioners (Male), including R Practitioners within six months of qualification, for the vacant post of House Surgeon (A). If held by an R Practitioner, appointment will be limited to six months. Salary is at the rate of £125 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

JOHN WILLIAMS, Secretary-Superintendent.

The Southampton Children's Hospital

AND DISPENSARY FOR WOMEN.

The Board of Management invite applications for the post of RESIDENT MEDICAL OFFICER (Lady).

Salary at the rate of £150 per annum, with board, residence, and laundry.

Applications, stating age and accompanied by copies of testimonials, to be sent to the undersigned not later than the 19th August, 1940.

The selected candidate will be required to take up her duties on the 31st August, 1940. The appointment is for six months.

ELLA K. MATTHEWS, Secretary.

Warrington Infirmary and Dispensary.

Applications are invited from registered Medical Practitioners, Male, for the appointment of a HOUSE SURGEON (A) to become vacant on 1st October, 1940, including R Practitioners within three months of qualification. If held by an R Practitioner, appointment will be for a period of six months. Otherwise it will be for a period of twelve months. Salary at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by recent testimonials, should be sent to the undersigned not later than Tuesday, 13th August, 1940.

HENRY L. BOOT, Superintendent and Secretary.

Royal Infirmary, Blackburn.

(244 Beds—Five Residents.)

Applications are invited from registered Medical Practitioners (Male) for the appointment of a HOUSE PHYSICIAN (A), including R Practitioners within three months of qualification. If held by an R Practitioner, appointment will be for a period of six months. Salary is at the rate of £175 per annum, with full residential emoluments. In addition to Medical Wards, to be attached to Eye, Ear, Nose, and Throat Wards.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

T. DEWHURST, General Superintendent and Secretary.

Royal Infirmary, Blackburn.

Victoria Central Hospital, Wallasey.

APPOINTMENT OF A HOUSE SURGEON (A).

Applications are invited from registered Medical Practitioners Male and Female, for the appointment of a House Surgeon (A) to become vacant on 1st October, 1940, including R Practitioners within three months of qualification. The appointment will be for a period of six months.

Salary is at the rate of £100 per annum, with full residential emoluments.

Applications, stating age, qualifications, with dates and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned as early as possible.

FRANK DEAN, F.C.I.S., Secretary Superintendent.

Beckett Hospital, Barnsley.

APPOINTMENT OF HOUSE PHYSICIAN (B2).

Applications are invited from registered Medical Practitioners, Male, for the appointment of House Physician. If held by R Practitioner the appointment will be limited to six months.

Salary £150 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

ARTHUR L. BOURNE, Secretary-Superintendent.

23rd July, 1940.

Dewsbury and District General INFIRMARY, DEWSBURY. (100 Beds.)

Applications are invited for the post of SECOND HOUSE SURGEON (A) (Male) vacant on August 15th next, including R Practitioners within six months of qualification. If held by an R Practitioner, appointment will be limited to six months. Salary £150 per annum, with emoluments. The duties are principally those of a House Physician and Casualty Officer.

The Infirmary is a modern Voluntary Hospital and has the usual Special Departments, with Visiting Consulting Specialists in attendance.

Applications, stating age, qualifications with dates, and nationality, together with copies of recent testimonials, to be addressed to my office without delay.

FRED SMITH, Secretary-Superintendent.

Swansea General and Eye Hospital.

(337 Beds.)

Applications are invited for the following posts:—

(1) HOUSE SURGEON to the AURAL and OPHTHALMIC DEPARTMENTS (B2). Salary at the rate of £200 per annum, with full residential emoluments.

(2) HOUSE SURGEON (A). Salary at the rate of £150 per annum, with full residential emoluments. Appointments if held by R Practitioners will be limited to six months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, to be forwarded to the undersigned.

O. C. HOWELLS, Secretary-Superintendent.

Lancashire County Council.

BIDDULPH GRANGE ORTHOPÆDIC HOSPITAL.

Applications are invited from registered Medical Practitioners, Male or Female, for the appointment of RESIDENT JUNIOR HOUSE SURGEON (B2) now vacant, including R Practitioners who now hold A Posts. If held by an R Practitioner the appointment will be limited to six months. Otherwise it will be for a minimum period of six months. The salary is at the rate of £250 per annum, together with board, residence, and laundry.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of two recent testimonials, should be sent to Dr. F. Hall, School Medical and Child Welfare Department, County Offices, Preston, not later than the 12th August.

GEORGE ETHERTON, Clerk of the County Council.

County Offices, Preston, 29th July, 1940.

King George's Sanatorium for Sailors,

LIPHOOK, HANTS (Seamen's Hospital Society)
(For the Treatment of Pulmonary and Non-pulmonary Tuberculosis.)

ASSISTANT MEDICAL OFFICER (B2—Male or Female).

Applications are invited for this appointment which will be available for a period of six months from 1st September, 1940. Salary at the rate of £250 per annum, together with full residential emoluments valued at £100 per annum.

Applications, stating age, qualifications, and experience, with copies of three recent testimonials, to be sent immediately to the undersigned.

F. A. LYON, Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

County Borough of Southend-on-Sea.

SOUTHEND MUNICIPAL HOSPITAL, ROCHFORD, ESSEX.

HOUSE MEDICAL OFFICER (A).

Applications are invited for the appointment of a House Medical Officer (A) at the Southend Municipal Hospital, Rochford, Essex, from registered Medical Practitioners, including R Practitioners within three months of qualification. If held by an R Practitioner, appointment will be for a period of six months.

The salary payable will be at the rate of £200 per annum, with full residential emoluments valued at £150 per annum.

Application forms, obtainable from the Medical Superintendent, should be returned not later than August 12th.

H. J. WORWOOD, Town Clerk.

Town Clerk's Office, Southend-on-Sea.

St. Paul's Eye Hospital, Liverpool.

Applications are invited from registered Medical Practitioners, Male or Female, for the post of RESIDENT HOUSE SURGEON (A). Six months' appointment. Salary £145 per annum, with board, &c.

Applications, stating age, qualifications, and nationality, accompanied by copies of three recent testimonials, should be sent to the Secretary by 31st August, 1940.

Northamptonshire County Council.

APPOINTMENT OF ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH.

Applications are invited from registered Medical Practitioners holding a diploma in public health or similar qualification for the appointment of Assistant County Medical Officer of Health under the above County Council and District Medical Officer for the Urban Districts of Burton Latimer, Corby, Desborough, and Rothwell, and the Rural District of Kettering.

The inclusive salary will be at the rate of £800 per annum, with a travelling allowance on the scale from time to time approved by the County Council. Office accommodation and clerical assistance will be provided.

The appointment is subject to the Local Government Superannuation Acts, 1937 and 1939, and the successful candidate will be required to pass a medical examination.

The officer appointed will act under the County Medical Officer of Health as Assistant School Medical Officer and Assistant Medical Officer for Maternity and Child Welfare, and perform such other duties as may be assigned to him by the County Council and County Medical Officer of Health.

The appointment will be subject to the Sanitary Officers (Outside London) Regulations, 1935, and the Local Government Act, 1933, and the officer appointed will be required to perform in the districts of the Local Sanitary Authorities referred to all the duties imposed on a District Medical Officer of Health by the relevant Acts, Orders, and Regulations.

The officer will be required to devote his whole time to the duties of the office and to reside in a place approved by the Authorities.

The appointment will be determinable (subject to the relevant provisions of the Local Government Act, 1933) upon three months' notice on either side.

Applications, stating age, qualifications, and experience, together with copies of not more than three recent testimonials, should reach the undersigned not later than the 14th August, 1940.

Canvassing will disqualify.

J. ALAN TURNER, Clerk of the County Council.

County Hall, Northampton, 23rd July, 1940.

City of Bradford.

Applications are invited for the post of ASSISTANT SCHOOL MEDICAL OFFICER.

Salary £500 per annum, rising, subject to satisfactory service, by annual increments of £25 to £700 per annum.

The salary is subject to a deduction under the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Form of application may be obtained from the Medical Officer of Health, Town Hall, Bradford, and should be returned not later than the 7th August, 1940.

N. L. FLEMING, Town Clerk.

Town Hall, Bradford, 19th July, 1940.

Birmingham and Midland Eye Hospital,

BIRMINGHAM, 3.

Applications are invited for the post of SURGICAL REGISTRAR B1 to the Hospital.

Candidates must have had not less than two years' experience in Ophthalmic work, and should have held a resident post in an Ophthalmic Hospital for at least one year.

Appointment will be for one year with eligibility for re-appointment.

Salary at the rate of £200 per annum, plus £50 per annum for attendances at the Branch Hospital.

Particulars of duties, &c., may be obtained on application. Applications, together with copies of testimonials, to be sent in not later than Wednesday, 7th August, 1940, addressed to the House Governor. F. M. HAUGHTON, House Governor.

County Borough of Newport.

PUBLIC ASSISTANCE COMMITTEE.

TEMPORARY SENIOR HOUSE SURGEON (B1).

Applications are invited from registered Medical Practitioners (Male) for the above appointment under the Emergency Hospital Scheme at Wooloston House Emergency Hospital (A1 Casualty Hospital). Suitably qualified R Practitioners holding B2 or B1 appointments are invited to apply. Salary £350 per annum, plus the usual residential emoluments. All fees with the exception of Coroner's Fees are payable to the Public Assistance Committee. Appointment terminable by 1 month's notice on either side.

Applications, stating age, qualifications and experience and accompanied by copies of three recent testimonials to be sent to the Public Assistance Officer, Town Hall, Newport, at once.

S. M. T. BURPITT, Town Clerk.

Town Hall, Newport, Mon, July, 1940.

Royal Berkshire Hospital, Reading.

TEMPORARY HONORARY ASSISTANT ANÆSTHETIST.

The Board of Management invites applications for the above appointment.

Candidates must be fully qualified and registered. The selected candidate will be appointed for the period ending on the third Tuesday in January, 1941, and will be eligible for re-election.

Canvassing by or on behalf of a candidate will disqualify him.

Applications, accompanied by not more than three testimonials, should be addressed to the undersigned and reach him not later than the first post on Friday, the 16th August.

H. E. RYAN, Secretary and House Governor.

Borough of Swindon.

APPOINTMENT OF DEPUTY MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER.

Applications are invited from duly qualified Medical Practitioners for the whole-time appointment of Deputy Medical Officer of Health and Assistant School Medical Officer to the Borough of Swindon at an inclusive salary of £600 per annum, rising by four annual increments of £25 to £700.

Intending applicants must possess the Diploma in Public Health or an equivalent qualification.

The appointment will be terminable by three months' notice on either side.

Form of application and conditions of appointment may be obtained on application to the undersigned.

Applications, accompanied by copies of not more than three recent testimonials, must be forwarded in an envelope endorsed "Deputy Medical Officer of Health," to reach me not later than the first post on Wednesday, the 14th August, 1940.

D. MURRAY JOHN, Town Clerk.

Civic Offices, Swindon, 19th July, 1940.

General Hospital, Nottingham.

(389 Beds.)

EAR, NOSE, AND THROAT DEPARTMENT.

Applications are invited from registered Medical Practitioners (Male and Female) for the appointment of a HOUSE SURGEON (A) for the above Department containing 40 Beds and a large Out-patient Department; duties to commence as soon as possible. The appointment is for six months. Salary at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

HENRY M. STANLEY, House Governor and Secretary.

General Hospital, Nottingham.

(389 Beds.)

Applications are invited from registered Medical Practitioners (Male and Female) for the appointment of a HOUSE PHYSICIAN (A) for the above Hospital—duties to commence as soon as possible. The appointment is for six months. Salary at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of testimonials, should be sent to the undersigned immediately.

HENRY M. STANLEY, House Governor and Secretary.

The Royal Alexandra Hospital for Sick

CHILDREN, BRIGHTON. (100 Beds.)

Applications are invited from registered Medical Practitioners (Male) for the appointment of a HOUSE PHYSICIAN (B2) to commence duties immediately. Salary is at the rate of £150 per annum with full residential emoluments. The Hospital is recognised for the D.C.H. Diploma and the M.D. Examination, Branch 1.

Also for HOUSE SURGEON (A) to commence duties at the end of August. Salary is at the rate of £150 per annum, with full residential emoluments. Appointments, if held by R Practitioners, will be limited to six months.

Applications, stating age, qualifications with dates and nationality, and accompanied by copies of recent testimonials, should be sent to the undersigned.

22nd July, 1940. PERCY F. SPOONER, Secretary.

The Children's Hospital, Sheffield.

(Inc.) (157 Beds.)

Applications are invited from Registered Medical Practitioners (Male and Female) for the appointment of HOUSE SURGEON "A" to fill the present vacancy, including R Practitioners within six months of qualification. If held by an R Practitioner, appointment will be limited to six months. Salary is at the rate of £100 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

T. H. G. GARTLAND, Superintendent and Secretary.

Royal Victoria Hospital, Dover.

(80 Beds.)

Wanted on or before the 22nd August RESIDENT MEDICAL OFFICER (Male) recently qualified and registered, preferably with some experience (B2). If held by an R Practitioner appointment will be limited to six months. Salary £180 per annum, with board, lodging, and laundry.

Applications, stating age, with particulars of experience, accompanied by copies of three recent testimonials, should be sent to the Secretary as soon as possible.

Liverpool and District Hospital for

DISEASES OF THE HEART,
34, Oxford Street, LIVERPOOL, 7.

Applications are invited from Registered Medical Practitioners, Male and Female, for the appointment of a HOUSE PHYSICIAN (A) to become vacant on 1st October, 1940. If held by an R Practitioner appointment will be for a period of six months. Salary is at the rate of £100 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 31st August, 1940. MISS LEWIS, Secretary.

County Borough of Halifax.

ASSISTANT MEDICAL OFFICER OF HEALTH—MATERNITY AND CHILD WELFARE (FEMALE).

Applications are invited from duly qualified and registered Medical Practitioners for the post of whole-time Assistant Medical Officer of Health—Maternity and Child Welfare (Female).

Applicants must be experienced in Antenatal Work, Midwifery, and Children's Diseases, and will be required to hold consultations at the Antenatal and Maternity and Child Welfare Centres in the County Borough of Halifax and to perform such other duties as appertain to the office.

The person appointed will be a member of the staff of the Medical Officer of Health and will work under his control and direction. She will be required to devote her whole time to the duties of her office and not to engage in private practice of any description.

The salary offered is £500 per annum, rising by annual increments of £25 to £700, and the post will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applications must be made on the prescribed form, to be obtained from the undersigned, and delivered, accompanied by copies of three recent testimonials, not later than first post on Tuesday, 20th August, 1940, endorsed "Assistant M.O.H.—Maternity and Child Welfare" and addressed to the Town Clerk, Town Hall, Halifax.

Canvassing, either directly or indirectly, will be a disqualification.

W. USHER, Town Clerk.

Town Hall, Halifax, 26th July, 1940.

York Maternity Hospital.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (FEMALE).

Applications are invited from registered Medical Practitioners (Female) for appointment as Resident Medical Officer to become vacant on the 31st August, 1940.

Applicants should have had post-graduate experience in Midwifery. The duties of the successful applicant will consist chiefly of Maternity and Child Welfare work in connexion with the York Maternity Hospital and the Child Welfare Clinics; she will be expected to perform other duties as may be prescribed by the Medical Officer of Health. The Medical Officer of Health is Medical Superintendent of the Hospital and there is a Consultant Medical Officer. The appointment will be for six months and is subject to the Council's Sick Allowance Regulations.

The salary will be at the rate of £350 per annum, together with emoluments (board-residence at the Hospital) valued at £150 per annum.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, together with copies of three recent testimonials, should be sent to the undersigned not later than 14th August, 1940.

P. R. MCNAUGHT, Medical Officer of Health.

50, Bootham, York.

Isle of Ely County Council.

(Amended Advertisement.)

ASSISTANT COUNTY MEDICAL OFFICER (FEMALE).

Applications are invited from duly qualified persons for the above post. Salary of £600 per annum, rising by two annual increments of £50 to £700 per annum. Duties will include school medical inspection, Maternity and Child Welfare, &c. Experience in tuberculosis, refraction, or mental deficiency will be an additional recommendation. The provision of a car will be required, and travelling expenses in accordance with the Council's scale will be allowed.

The person appointed will be required to devote her whole time to the duties involved. The Local Government Superannuation Act, 1937, will apply, and it will be necessary for the successful candidate to pass a medical examination.

Forms of application may be obtained from the County Medical Officer, County Hall, March, to whom they should be returned, accompanied by copies of not more than three recent testimonials, not later than the 14th August, 1940.

Canvassing, directly or indirectly, will disqualify.

R. F. G. THURLOW, Clerk of the County Council.

County Hall, March, 26th July, 1940.

Chelmsford and Essex Hospital.

(155 Beds, Emergency Beds 80—Total 235.)

HOUSE PHYSICIAN required (Female). Salary £150 per annum, with board, apartments, and laundry.

Applications, stating age, qualifications, to be sent to the undersigned immediately. Vacancy to be filled immediately.

R. G. MORRISH, Secretary.

London-road, Chelmsford.

Hospital of St. Cross, Rugby.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (A).

Applications are invited from registered Medical Practitioners (Male) for the appointment of a Resident Medical Officer (A), now vacant, including R Practitioners within six months of qualification. If held by an R Practitioner, appointment will be limited to six months. Otherwise it will be for a period of six months, at the end of which time applicants will be eligible for reappointment for a further six months.

Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

HARVEY RACE, Superintendent and Secretary.

City and County of the City of Exeter

EDUCATION COMMITTEE.

TEMPORARY ASSISTANT DENTAL SURGEON.

Applications are invited from Male licentiates in dental surgery for the post of whole-time temporary Assistant Dental Surgeon. The duties will consist chiefly in the inspection and treatment of children, but will also include dental work for other Committees of the Council as may be determined from time to time. Duties to commence on 2nd September, 1940. The salary will be £500 per annum.

Application forms may be obtained from the Secretary for Education, 39, Southernhay West, Exeter, and should be returned to him immediately, together with copies of not more than three recent testimonials. C. J. NEWMAN, Town Clerk.

10, Southernhay West, Exeter.

County Borough of Northampton.

APPOINTMENT OF TEMPORARY ASSISTANT MEDICAL OFFICER FOR MATERNITY AND CHILD WELFARE WORK.

The Town Council of Northampton invites applications from registered Medical Women between the ages of twenty-five and forty-five years for the above whole-time appointment.

Applicants should have had at least three years' experience in the practice of their profession and have had special experience in midwifery and antenatal work and administrative duties in connexion with maternity and child welfare. They should also be registered in the Medical Register as holders of a diploma in sanitary science, public health, or State medicine.

The officer appointed will be required to devote her whole time to the duties of the office. These comprise such administrative and clinical work under the direction and supervision of the Medical Officer of Health, as may reasonably appertain to the Council's scheme of maternity and child welfare.

The salary is £600 per annum, plus a temporary cost-of-living bonus at present amounting to £24 per annum. The post is subject to the Local Government Superannuation Acts and the selected candidate will be required to pass satisfactorily a medical examination.

Copies of application forms and list of duties may be obtained from the Medical Officer of Health, 7A, St. Giles'-square, Northampton.

Applications, accompanied by copies of not more than three recent testimonials, must reach the undersigned not later than Wednesday, 21st August, 1940. W. R. KEW, Town Clerk.

Guildhall, Northampton, 30th July, 1940.

City of Portsmouth.

TUBERCULOSIS OFFICER AND SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH.

Applications are invited for the above appointment from registered Medical Practitioners having special experience in the diagnosis and treatment of tuberculosis. Previous experience in general public health, and the possession of a D.P.H., are essential.

Salary will be at the rate of £750 per annum, rising by three biennial increments of £50, and one of £37 10s., to £937 10s., but the commencing salary will be fixed according to the previous experience of the successful applicant.

Applicants must not exceed forty years of age.

The duties will be concerned mainly with tuberculosis, but the successful candidate will be required to perform other duties in the Health Department.

The post will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. He may reside in any district of Portsmouth or Southsea.

Application forms may be obtained from, and must be returned to, the Acting Medical Officer of Health, Northern Secondary School, Portsmouth, not later than Friday, 16th August, 1940.

F. J. SPARKS, Town Clerk.

The Guildhall, Portsmouth, 29th July, 1940.

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West Berks United Districts.

APPOINTMENT OF TEMPORARY MEDICAL OFFICERS OF HEALTH.

The Joint Committee of the West Berks United Sanitary District invite applications for the appointment of two temporary Medical Officers of Health for the areas of (*a*) North Berks and (*b*) South Berks, respectively.

Applicants must be registered Medical Practitioners, not under thirty years of age, holding a diploma in public health, sanitary science, or state medicine. Previous local government experience will be an additional qualification.

The appointments are, with the consent of the Minister of Health, temporary pending the rearrangement of the West Berks United District, and are subject to three months' notice on either side.

The salary offered is £800 per annum and the post will be subject to the provisions of the Local Government (Superannuation) Acts.

The persons appointed will not be permitted to engage in private practice and must devote the whole of their time to the duties of their office.

The person appointed for North Berks must reside at Abingdon and the person appointed for South Berks at Newbury.

Office accommodation and clerical assistance will be provided and a travelling allowance will be paid. The officers appointed will be expected to provide their own motor-cars.

Forms of application, with particulars of the appointment, can be obtained from the undersigned Clerk of the United District Committee, to whom applications should be forwarded not later than the 26th day of August, 1940.

BROMLEY CHALLENOR,
Clerk of the West Berks United District Committee.
67, Stert-street, Abingdon, Berks.
29th July, 1940.

Royal Sheffield Infirmary and Hospital.

THE ROYAL INFIRMARY, SHEFFIELD. (470 Beds.)

Applications are invited from registered Medical Practitioners for the following appointments now vacant:—

(1) MEDICAL CLINICAL ASSISTANT (B1).
(2) RESIDENT SURGICAL OFFICER (B1).

Applicants should have held house appointments and had experience. In connexion with (2) preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R Practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of (1) £300 per annum, non-resident, (2) £200 per annum, with board and residence.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned forthwith.

H. KINGSLEY PEARCE,
General Superintendent and Secretary.
The Royal Infirmary, Sheffield 6, 30th July, 1940.

Great Western Railway Medical Fund SOCIETY.

APPOINTMENT OF TEMPORARY EAR, NOSE, AND THROAT SURGEON.

Applications are invited for the post of Temporary Ear, Nose, and Throat Deputy Surgeon to the above Society. Applicants should possess the F.R.C.S. diploma of one of the Royal Colleges, and must have special experience of ear, nose, and throat diseases, and be capable of deputising for the Society's Surgeon in general surgery.

The salary will be at the rate of £500 per annum, and the office will be subject to the supervision of the Society's Superintendent Medical Officer; payment by other authorities will be by separate arrangement.

The successful candidate will be expected to enter into an agreement for service with the Society for the Society's work and to reside within the Borough of Swindon.

The person appointed will be allowed to undertake such private practice as will not interfere with the work of this society.

Applications, stating age, qualifications, experience, and nationality, together with copies of three recent testimonials, should be sent to reach the Secretary not later than Saturday, 10th August.

Milton Road, Swindon.

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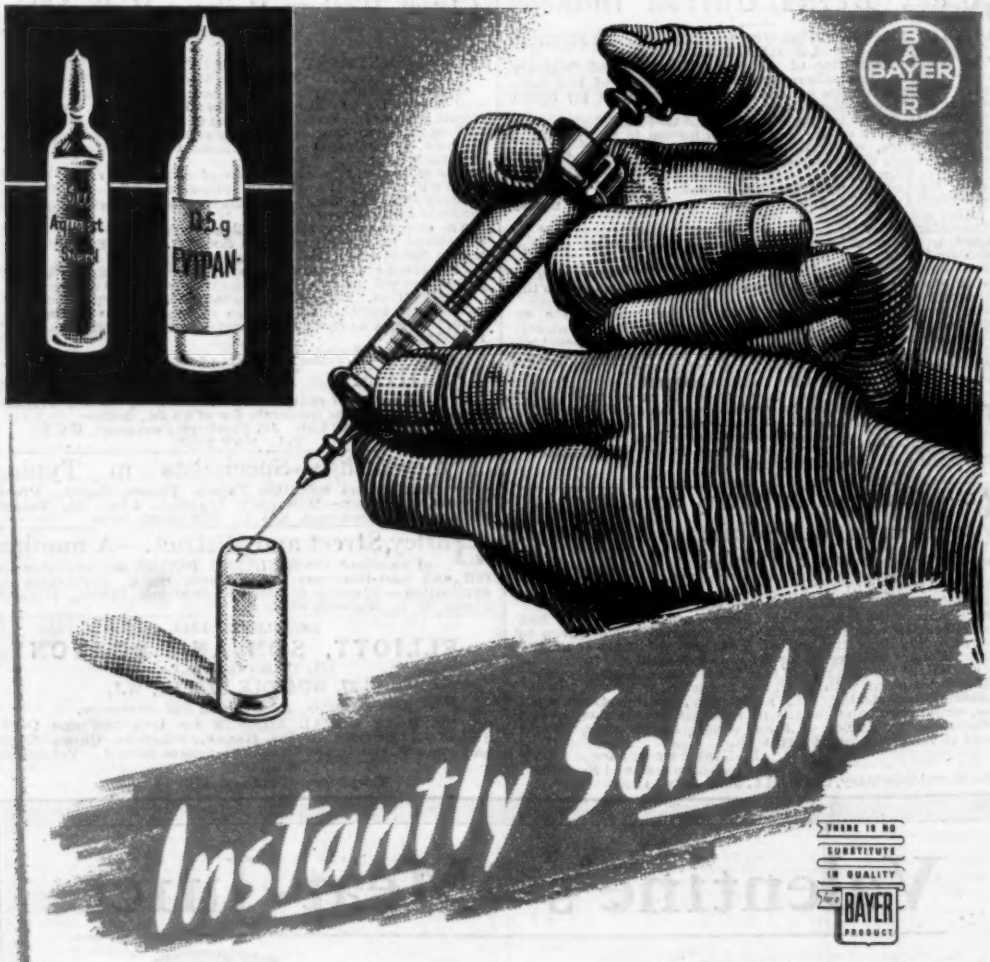

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